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PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 15 IN SET 336

Webcor Model 1658 was covered in Photofact Folder 15 - Set 336.

Models 1755, 1759 and 1762 are electrically identical to the model covered except for the following changes.

Model 1755

NEW AF AMPLIFIER TUBE

V1, AF Amplifier, is changed from 12AX7 to 12AU7.

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COMPONENT CHANGES

R4 is omitted.

R5 is decreased from 4. 7Meg to 1. 5Meg.

C4 is omitted.

R8 is increased from 470Ω to 2200Ω.

A .01MFD Ⓢ 500V capacitor is added from pin 3 of V1 to ground.

An 1800Ω ½ watt resistor is added from R8 to ground.

R7 is decreased from 24K to 6800Ω.

C5 is increased from 1500MMF to 5000MMF.

R9 is decreased from 4. 7Meg to 470K.

Two 6800Ω ½ watt resistors are added in series from pin 8 of V1 to ground.

R6 is decreased from 150K to 68K.

R10 is decreased from 68K to 22K.

C7 is increased from 2000MMF to 3900MMF.

R2, treble control and switch, is changed to part #31P113.

R3, bass control, is changed to part #31P114.

T2, audio output transformer, is changed to part #67P053.

R18 is increased from 3300Ω to 3900Ω.

Model 1759

NEW AF AMPLIFIER TUBE

V1, AF Amplifier, is changed from 12AX7 to 12AU7.

COMPONENT CHANGES

R4 is omitted.

C4 is omitted.

R5 is decreased from 4. 7Meg to 1. 5Meg.

R8 is increased from 470Ω to 2200Ω.

A 5600Ω ½ watt resistor is added from R8 to ground.

A .01MFD Ⓢ 500V capacitor is added from pin 3 of V1 to ground.

R7 is decreased from 24K to 12K.

R6 is decreased from 150K to 68K.

C5 is increased from 1500MMF to 3900MMF.

WEBCOR MODELS 1755, 1759, 1762

(Con't on reverse side)

PRODUCTION CHANGES
BULLETIN 184

PRODUCTION CHANGES
BULLETIN 184

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	R9 is decreased from 4. 7Meg to 470K. R10 is decreased from 68K to 56K. A 6800Ω and a 10K ½ watt resistor are added in series from pin 8 of V3 to ground. R12 is decreased from 220K to 100K. C11 is increased from 1000MMF to 2000MMF. R18 is increased from 3300Ω to 3900Ω. R2, treble control and switch, is changed to part #31P113. R3, bass control, is changed to part #31P114. T2, audio output transformer, is changed to part #67P048.
Model 1762	NEW AMPLIFIER TUBE V1, AF Amplifier, is changed from 12AX7 to 12AU7. COMPONENT CHANGES R4 is omitted. C4 is omitted. R5 is decreased from 4. 7Meg to 1. 5Meg. R8 is increased from 470Ω to 2200Ω. An 1800Ω ½ watt resistor is added from R8 to ground. A .01MFD @ 500V capacitor is added from pin 3 of V1 to ground. R7 is decreased from 24K to 6800Ω. C5 is increased from 1500MMF to 5000MMF. R6 is decreased from 150K to 68K. R9 is decreased from 4. 7Meg to 470K. R10 is decreased from 68K to 22K. Two 6800Ω ½ watt resistors are added in series from pin 8 of V1 to ground. C7 is increased from 2000MMF to 3900MMF. R18 is increased from 3300Ω to 3900Ω. T2, audio output transformer, is changed to part #67P053.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 308

RCA VICTOR MODELS 21-T-6082, U, 21-T-6083, U, 21-T-6087, U, 21-T-6114, U, 21-T-6115, U, 21-T-6117, U, 21-T-6225, U, 21-T-6227, U, 21-T-6255, U, 21-T-6256, U, 21-T-6257, U (Ch. KCS96, A, B, C, D, E)

RCA Victor Models 21-T-6082, 21-T-6082U, 21-T-6083, 21-T-6083U, 21-T-6114, 21-T-6114U, 21-T-6115, 21-T-6115U, 21-T-6117, 21-T-6117U, 21-T-6225, 21-T-6225U, 21-T-6227, 21-T-6227U, 21-T-6255, 21-T-6255U, 21-T-6256, 21-T-6256U, 21-T-6257 and 21-T-6257U (Ch. KCS96, A, B, C, D, E) were covered in Photofact Folder 10 - Set 308.

Models 21-T-6087 and 21-T-6087U (Ch. KCS96, A) are added, along with late production changes, with the publication of this bulletin.

COMPONENT CHANGES

C111 is decreased from 680MMF to 560MMF.

A .01MFD Ⓖ 500V ceramic capacitor is added from pin 7 of V10A, sound IF, to ground.

A 300 microhenry peaking coil (part #101289) is added between R49 and R50.

R69 is decreased from 1000Ω to 100Ω.

R75 is decreased from 330K to 68K and in some models is decreased from 330K to 3300Ω.

R98 is increased from 470K to 820K.

R51 is increased from 560Ω to 680Ω.

An 82Ω resistor is added from pin 7 of V10A, sound IF, to ground.

A 220K resistor is wired in parallel with L51.

L44, series peaking coil, is changed to part #101819. Following is the direct replacement data for the component mentioned above:

MILLER	MEISSNER	MERIT
6176	19-3036	TV-180

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 5 IN SET 301

FIRESTONE MODELS 4-A-141, 4-A-142 (Code 382-6-398)

Firestone Models 4-A-141, 4-A-142 (Code 382-5-377) were covered in Photofact Folder 5 - Set 301.

Models 4-A-141, 4-A-142 (Code 382-6-398) are electrically identical to the models covered except for the following changes.

COMPONENT CHANGES

A 330K ½ watt resistor is added in parallel with C2.

R3 is omitted.

C7 is omitted.

C1C is omitted.

C1A and C1B electrolytic capacitor is changed to part #43672.

C5 is removed and rewired in parallel with the primary winding of T1, audio output transformer.

M1, tuning capacitor, is changed to part #43987.

L2, oscillator coil, is changed to part #43644-1.

L3, input IF coil, is changed to part #43669-2.

L4, output IF coil, is changed to part #43669-2.

T1, audio output transformer, is changed to part #42700-11.

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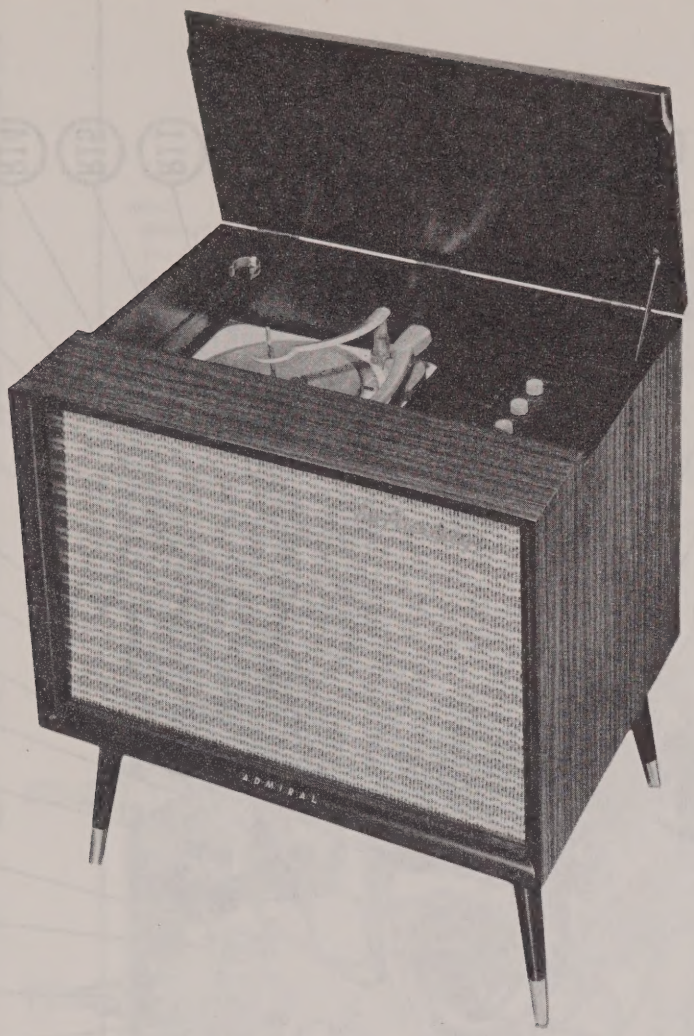
ADMIRAL
CHASSIS 5N3, 5N3A



ADMIRAL
CHASSIS 5N3, 5N3A

TRADE NAME	Admiral Models HC2276, HC2277 (Ch. 5N3A), 5M36D, 5M37D, 5M56D, 5M57D (Ch. 5N3)
MANUFACTURER	Admiral Corp., 3800 W. Cortland Street, Chicago 47, Illinois
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Six)	Types 12AX7 1st AF Amp.-Cath. Follower, 6AV6 2nd AF Amplifier, 6SN7GTB 3rd AF Amp.-Phase Inv., (2) 6DG6 (Or) 6W6GT Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .75 Amp. @ 117 Volts AC (80 Watts Without Motor)

RECORD CHANGER — ADMIRAL RC654

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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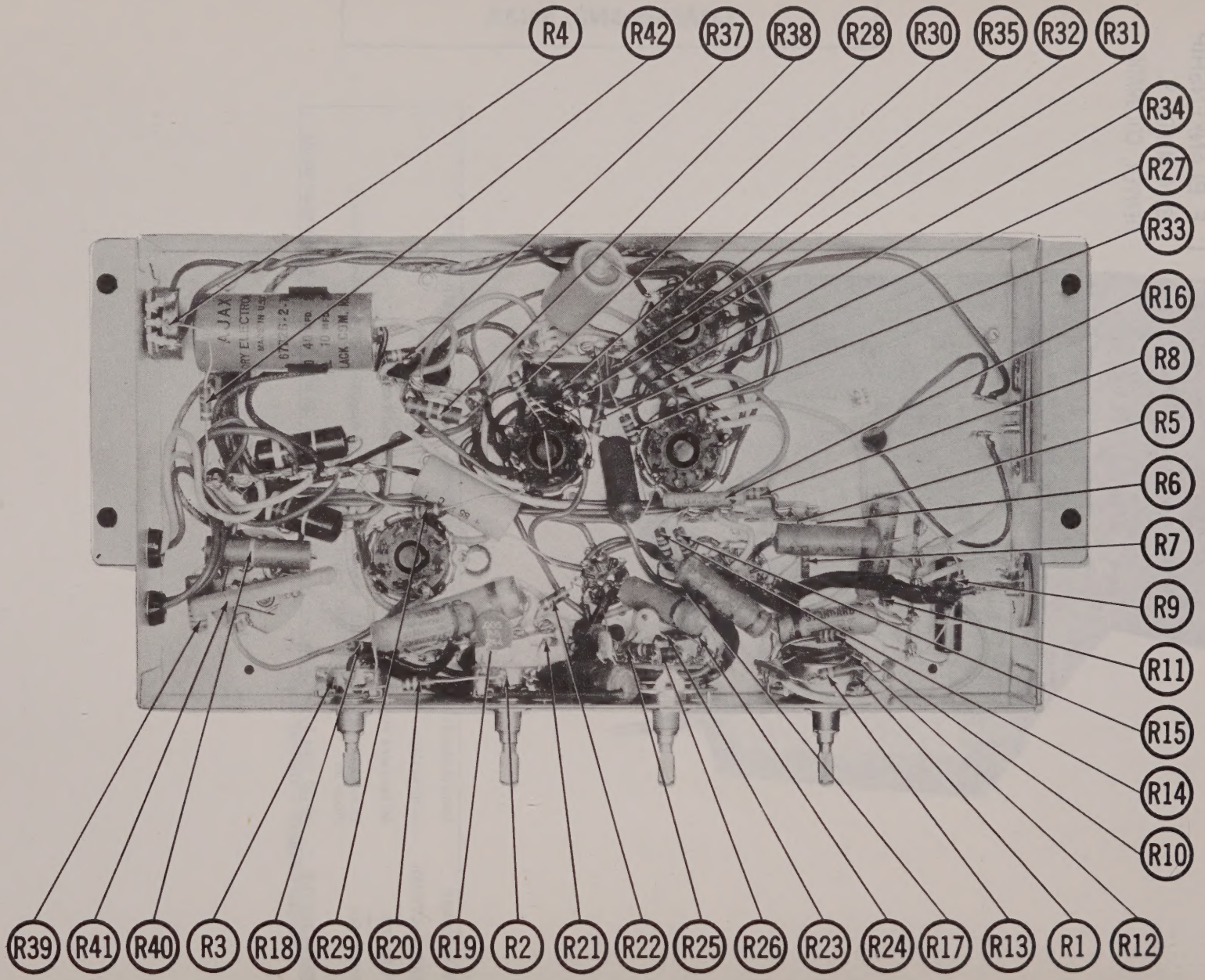


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	1st AF Amp. -Cath. Follower	12AX7	
V2	2nd AF Amplifier	6AV6	
V3	3rd AF Amp. -Phase Inv.	6SN7GTB	
V4	Output	6DG6GT	Note 1
V5	Output	6DG6GT	Note 1
V6	Rectifier	5Y3GT	

Note 1: Some versions may use 6W6GT in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▬80	300	67C7-29	AFH3-25-50	CO194	FP375.5	TMQ-120	Q-012	TVL-3583
B	▲40	300							
C	■40	300							
C2A	10	250	67B26-2	PRS450V4020	CO130	TCT3764	TDLD-21	T-075	TVA-2520
B	40	250							
C3	25	15	67A4-30	PRS25V25	BBR25-25	TC26	TD-25-25	FM-0225	TVA-1205
C4	50	25	67A4-31	PRS25V50	BBR50-25	TC29	TD-50-25	FM-0250	TVA-1206

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	.003	600	64B1-13	BPD-003	DD-302	CUB6D3	ED-003	GEM-623	6TM-D33	Note 1
C6	.015	200	64A2-26	BPD-015	DF-153	CUB2S15	ED-015	GEM-2115	2TM-S15	
C7	.033	400	64B1-23	BPD-03	DF-303	CUB4S33		GEM-4133	4TM-S33	
C8	250									Note 2
C9	.015	200	64A2-26	BPD-015	DF-153	CUB2S15	ED-015	GEM-2115	2TM-S15	
C10	100		65C6-3	NPO-S100	TCO-100	C10T1C	TCO-100	ZT-531	5TCC-T1	
C11	5000		65C10-1	BPD-005	DD-502	BYA6D5	ED-005	DC525	5HK-D5	
C12	5000		65C10-1	BPD-005	DD-502	BYA6D5	ED-005	DC525	5HK-D5	
C13	.02	400	64B1-24	BPD-02	DF-203	CUB4S2	ED-02	GEM-412	4TM-S2	Note 3
C14	680	1000	65C10-43	HVD-15-680	DD-681	BYA10T68	HD15-680	DC30368	10HKB-T68	
C15	.1	200	64B1-30	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C16	.0068	200	64A2-15	P288N-0068	D6-682	CUB2D68	ED-0068	GEM-2268	2TM-D68	
C17	5000		65C10-1	BPD-005	DD-502	BYA6D5	ED-005	DC525	5HK-D5	
C18	.05	400	64B1-32	BPD-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C19	.02	400	64B1-24	BPD-02	DF-203	CUB4S2	ED-02	GEM-412	4TM-S2	
C20	680	1000	65C10-43	HVD-15-680	DD-681	BYA10T68	HD15-680	DC30368	10HKB-T68	
C21	680	1000	65C10-43	HVD-15-680	DD-681	BYA10T68	HD15-680	DC30368	10HKB-T68	
C22	680	1000	65C10-43	HVD-15-680	DD-681	BYA10T68	HD15-680	DC30368	10HKB-T68	
C23	250									Note 2
C24	.022	400	64B1-24	BPD-02	DF-203	CUB 4S22	ED-02	GEM-4122	4TM-S22	
C25	.022	400	64B1-24	BPD-02	DF-203	CUB 4S22	ED-02	GEM-4122	4TM-S22	
C26	4.0	10	64B13-1	P1.589XP-4						
C27	.047	400	65A13-5	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C28	.047	400	65A13-5	BPD-05	DF-503	CUB 4S47		GEM-4147	4TM-S47	

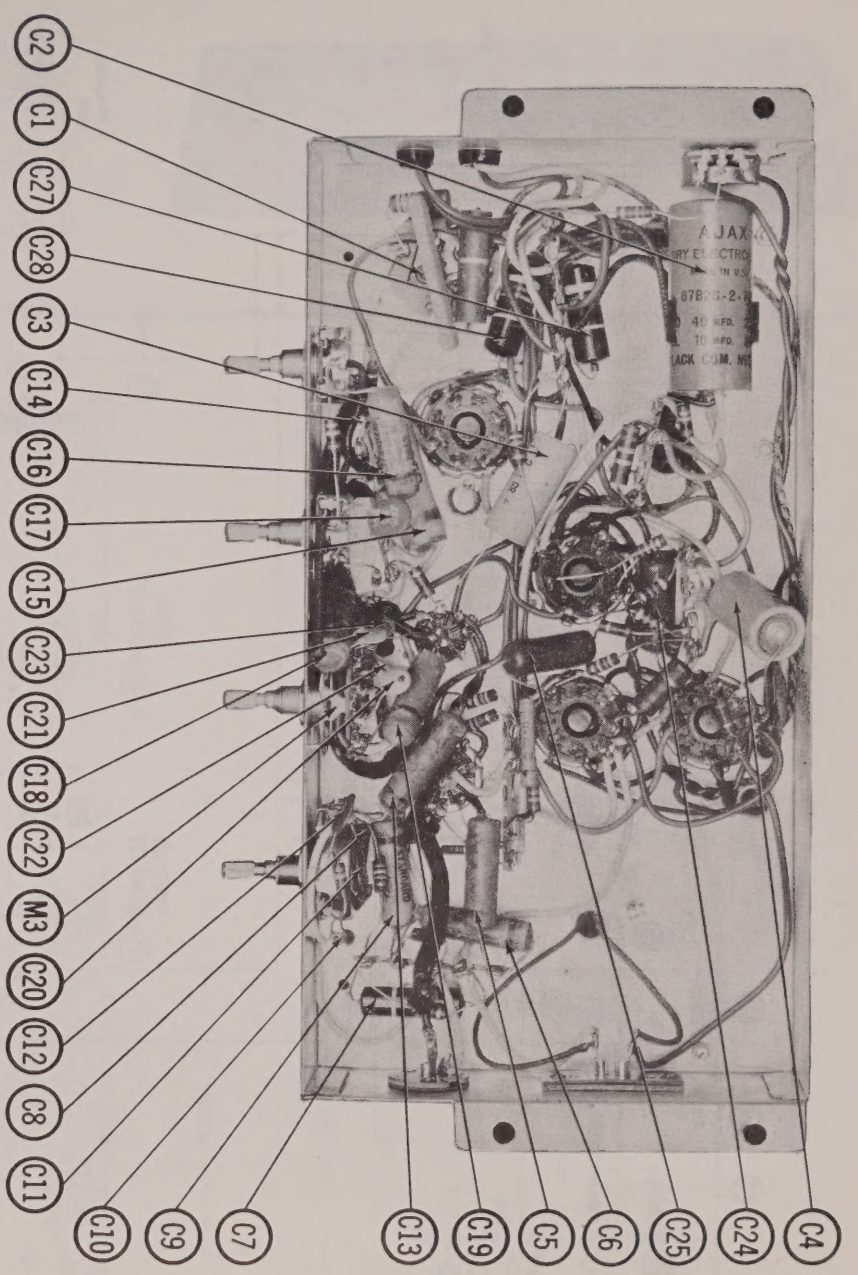
Note #1. Early production versions use .02MFD in this application (Part #64B1-24).
Note #2. Some versions may use 220MMF in this application (Part #65C6-80).
Note #3. Used in Chassis 5N3A only.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	75C1-72					Volume tap @ 150K & 250K
B	Shaft							
R2A	1Meg	½	75C1-68	B-69	A47-1Meg-S	Q13-137	U54	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	1Meg	½	75C1-68	B-69	A47-1Meg-S	Q13-137	U54	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	6000Ω	½	75C13-81	B-13				Hum Level Note #1
B	Shaft			Not Req.				

Note #1. Alternate Part #75C13-66 May Be Used In Some Versions.

CHASSIS BOTTOM VIEW-CAPACITOR IDENT.



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ADMIRAL PART No.	IRC PART No.	
R5	1Meg		60B8-105	BTS-1Meg	
R6	100K		60B8-104	BTS-100K	
R7	2200Ω		60B8-222	BTS-2200	
R8	27K 5%		60B7-273	BTS-27K 5%	
R9	390K		60B8-394	BTS-390K	
R10	390K		60B8-394	BTS-390K	
R11	220K		60B8-224	BTS-220K	
R12	51K 5%		60B7-513	BTS-51K 5%	
R13	51K 5%		60B7-513	BTS-51K 5%	
R14	470K		60B8-474	BTS-470K	
R15	470Ω		60B8-471	BTS-470	
R16	22K		60B8-223	BTS-22K	
R17	220K		60BA-224	BTS-220K	
R18	150K		60B8-154	BTS-150K	
R19	47K 5%		60B7-473	BTS-47K 5%	
R20	10K		60B8-103	BTS-10K	
R21	4700Ω 5%		60B7-472	BTS-4700 5%	
R22	1000Ω		60B8-102	BTS-1000	
R23	180K		60B8-184	BTS-180K	
R24	82K		60B8-823	BTS-82K	
R25	120K		60B8-124	BTS-120K	
R26	120K		60B8-124	BTS-120K	
R27	1Meg		60B8-105	BTS-1Meg	
R28	330K		60B8-334	BTS-330K	
R29	4700Ω		60B8-472	BTS-4700	
R30	47K		60B8-473	BTS-47K	
R31	47K		60B8-473	BTS-47K	
R32	470K 5%		60B8-474	BTS-470K 5%	
R33	470K 5%		60B8-474	BTS-470K 5%	
R34	150Ω	2	60B20-151	BTB-150	
R35	8200Ω		60B8-822	BTS-8200	
R36	22Ω	1	60B14-220	BTA-22	
R37	10K		60B8-103	BTS-10K	
R38	22K	1	60B14-223	BTA-22K	
R39	33K	1	60B14-333	BTA-33K	
R40	2200Ω	2	60B20-222	BTB-2200	
R41	200Ω	5	61A1-37	PW7-200	
R42	1.8Meg		60B8-185	BTS-1.8Meg	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ③.75A	480VCT ③.144A	5VAC ③ 2A	6.3VCT ③3.8A	80B48-1					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4700Ω CT	3-4Ω	79C56-3	Z1007 ①	A-2935		22S58		① Drill new mtg. hole.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ADMIRAL PART No.	QUAM PART No.	
SP1	3½"	PM	3-4Ω	78B91-2 ①	3A15TZ3	① Used in all models.
SP2	10"	PM	3-4Ω	78B88-32 ②	10A4A	② Used in models HC2276, HC2277.
	8"	PM	3-4Ω	78B92-4 ③		③ Used in models 5M36D, 5M37D, 5M56D, 5M57D.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	ADMIRAL PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M1	409B20	55-T	GD-J	56	PT-2	

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

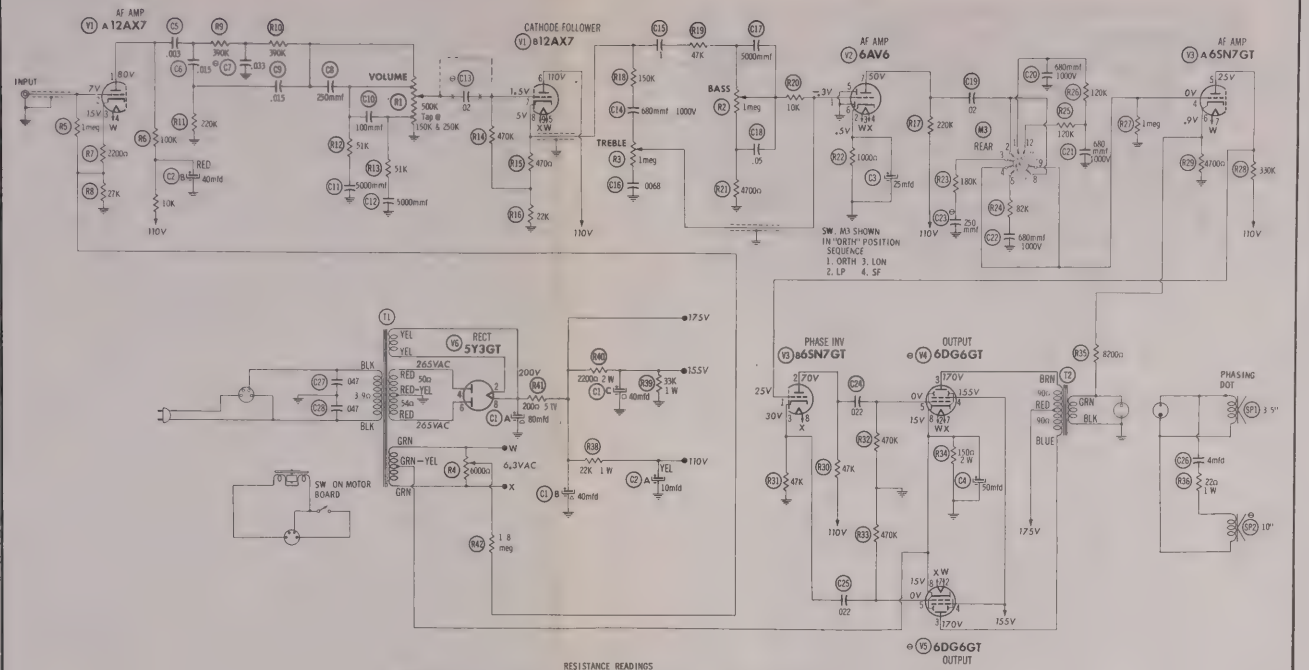
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ADMIRAL PART No.	JENSEN PART No.	WALCO PART No.	
M2	98B15-43 or 98B15-45 ①	*JP-36 or †JPS-36 or †♦JPS-36SD or ♦JPS-36D	*W-33TPA or †W-33TPS or †♦W-33DS or ♦W-33TPD	* Metal † Jewel ♦ Diamond ① Alt. part no. may be used in models HC2276 and HC2277.

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M3	Switch	77A56-3	Compensator (Rotary, Wafer Type)
	Knobs	33A169-2	Models HC2276, HC2277.
	Knobs	33D81-11	Models 5M36D, 5M37D, 5M56D, 5M57D.
	Cabinet	35E387-2	Mahogany.
	Cabinet	35E387-3	Blonde.
	Cabinet	35E330-2	Mahogany, Model 5M56D.
	Cabinet	35E330-3	Blond, Model 5M57D.
	Cabinet	35E277-2	Mahogany, Model 5M36D.
	Cabinet	35E277-3	Blond, Model 5M37D.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	↑130K	1Meg	29K	150Ω	150Ω	↑22K	490K	22K	150Ω
V2	6AV6	14K	1000Ω	150Ω	150Ω	0Ω	0Ω	↑240K		
V3	6SN7GT	↑350K	↑70K	47K	1Meg	↑350K	4700Ω	150Ω	150Ω	
V4	6DG6GT	TP	150Ω	↑290Ω	↑2400Ω	470K	TP	150Ω	150Ω	
V5	6DG6GT	TP	150Ω	↑290Ω	↑2400Ω	470K	NC	150Ω	150Ω	
V6	5Y3GT	NC	40K	NC	50Ω	NC	55Ω	NC	40K	

↑ MEASURED FROM PIN 8 OF V6.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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PROPERTY OF
C. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HALLICRAFTERS
MODEL TR-88

TRADE NAME	Hallicrafters Model TR-88
MANUFACTURER	Hallicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill.
TYPE SET	Battery Operated Portable AM Transistorized Receiver

POWER SUPPLY 6 Volts DC RATING 7MA @ 6 Volts DC
TUNING RANGE—BROADCAST 540KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Across secondary winding of antenna.	455KC (400∿ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Adjust for maximum output.
2.		"	"	Slowly cover entire tuning range.	"	A4, A5	Adjust so that oscillation (if any) throughout tuning range is eliminated.
	NOTE: IF oscillation (if any) will be heard as distortion ranging from "motor boating" to a howl. Some SLIGHT adjusting of A1, A2 and A3 may be necessary to obtain neutralization over entire tuning range.						
3.		Loop	1620KC	Tuning gang fully open.	"	A6	Adjust for maximum output.
4.		"	1400KC	1400KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.		"	535KC	Tuning gang fully closed.	"	A8	"

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
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PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	USE	Hallicrafters PART NO.	NOTES
X1	Converter	112-001	
X2	1st IF Amplifier	112-002	
X3	2nd IF Amplifier	112-002	
X4	AF Amplifier	112-004	
X5	Output	112-003	Note 1
X6	Output	112-003	Note 1

Note 1: X5 and X6 are a matched pair.

TRANSISTOR SUBSTITUTION CHART

Hallicrafters PART NO.	General Transistor TYPE	General Electric TYPE	Raytheon TYPE	RCA TYPE	Texas Inst. TYPE
112-001	GT761	2N136	760, 2N112, CK761		
112-002	GT760	2N135	CK760, 2N112, CK766	2N139	
112-003	GT2N109	2N186		2N109	2N109, 352
112-004	GT81, 2N109	2N191		2N109	310

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Hallicrafters PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	10	6	45B360	XPP6V10	NL10-6	TAP25-10	ML10-6	MMT-0210	TE-1087
C2	30	6	45B359	XPP6V30	NL30-6	TAP6-30	ML30-6		TE-1092
C3	30	6	45B359	XPP6V30	NL30-6	TAP6-30	ML30-6		TE-1092
C4	100	6	45B371	SRE6V100	NL100-6				TE-1102

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	10000		47A224	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C6	10000		47A224	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C7	4-40		44-471							
C8	50000		47A624	BPD-05	DF-503					
C9	4-40		44-471							
C10	50000		47A624	BPD-05	DF-503					
C11	20000		47A242	BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Hallicrafters PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	10K	½	25B1405	B-15	A47-10K-Z	Q13-116	U18	Volume - Note 1
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	

Note 1: Alternate part #25B1353 may be used in some versions.

RESISTORS

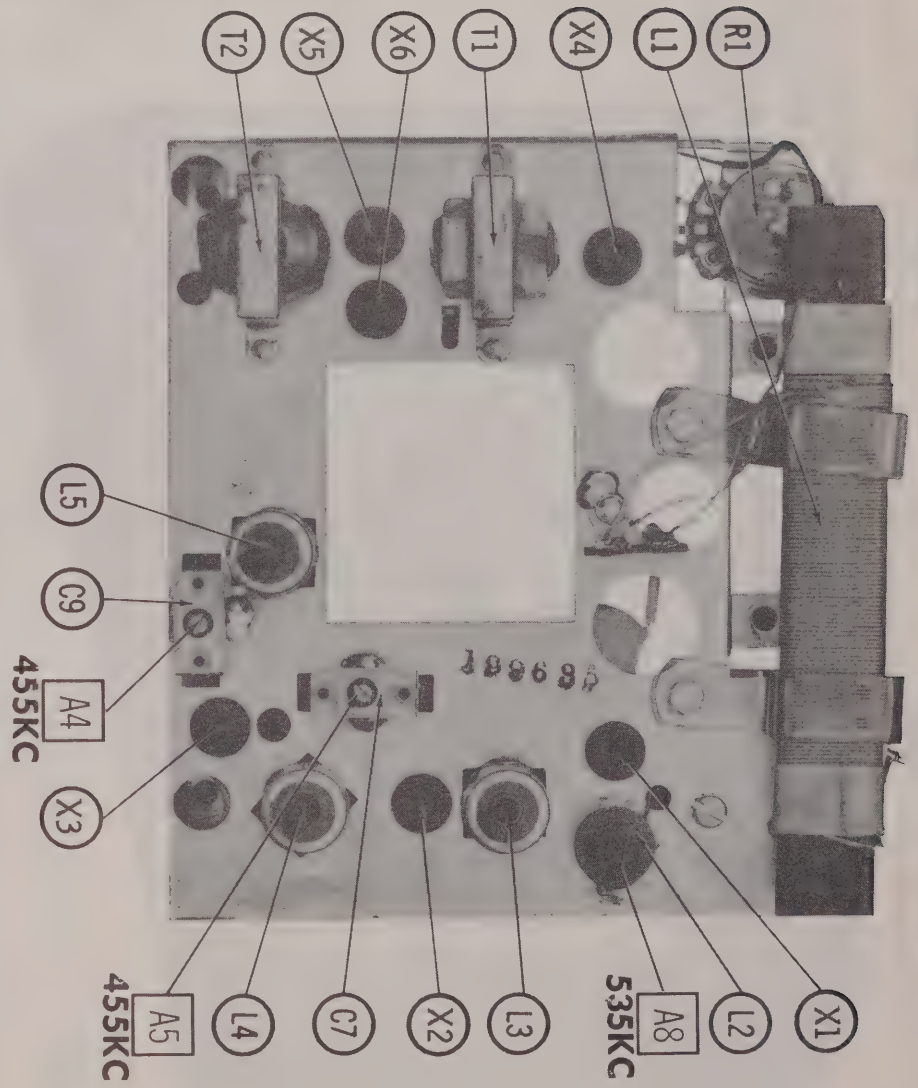
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Hallicrafters PART No.	IRC PART No.	
R2	10K		23X20X103K	BTS-10K	
R3	3300Ω		23X20X332K	BTS-3300	
R4	47K		23X20X473K	BTS-47K	
R5	470Ω		23X20X471K	BTS-470	
R6	1000Ω		23X20X102K	BTS-1000	
R7	4700Ω		23X20X472K	BTS-4700	
R8	68K		23X20X683K	BTS-68K	
R9	15K		23X20X153K	BTS-15K	
R10	2200Ω		23X20X222K	BTS-2200	
R11	820Ω		23X20X821K	BTS-820	
R12	120Ω		23X20X121K	BTS-120	
R13	8.2Ω		23X20X082K		
R14	8.2Ω		23X20X082K		
R15	3900Ω		23X20X392K	BTS-3900	

TRANSFORMER (DRIVER)

ITEM No.	Turns Ratio		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.7	1	55C295						

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Hallicrafters PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	465Ω	11Ω	55C294				TR-19 ①		① Use original channel mtg. frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Hallicrafters PART No.	QUAM PART No.	
SP1	4"	PM	11Ω	85-192	4A07Z11	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	57C228	14-9013			
L2	Osc. Coil	51-2153				
L3	1st IF Trans.	50-698				
L4	2nd IF Trans.	50-696				
L5	3rd IF Trans.	50-697				

BATTERIES

ITEM No.	VOLTAGE	Hallicrafters PART No.	REPLACEMENT DATA								
			BURGESS			EVEREADY			MALLORY		
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	"A"	"B"	"A-B"
M1	1½V		1*			635*			M-14*		

* Connect 4 in series.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		Hallicrafters PART No.	SYLVANIA PART No.	
M2	1N87G or 1N60	19B1933	1N60	Audio Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M3	Tuning Cap.	48C379	Two Gang (12-138MMF, 17-98MMF)
	Knob	15-1018	Tuning
	Knob	15-1019	On-Off Volume
	Cabinet	78E1417	Leather

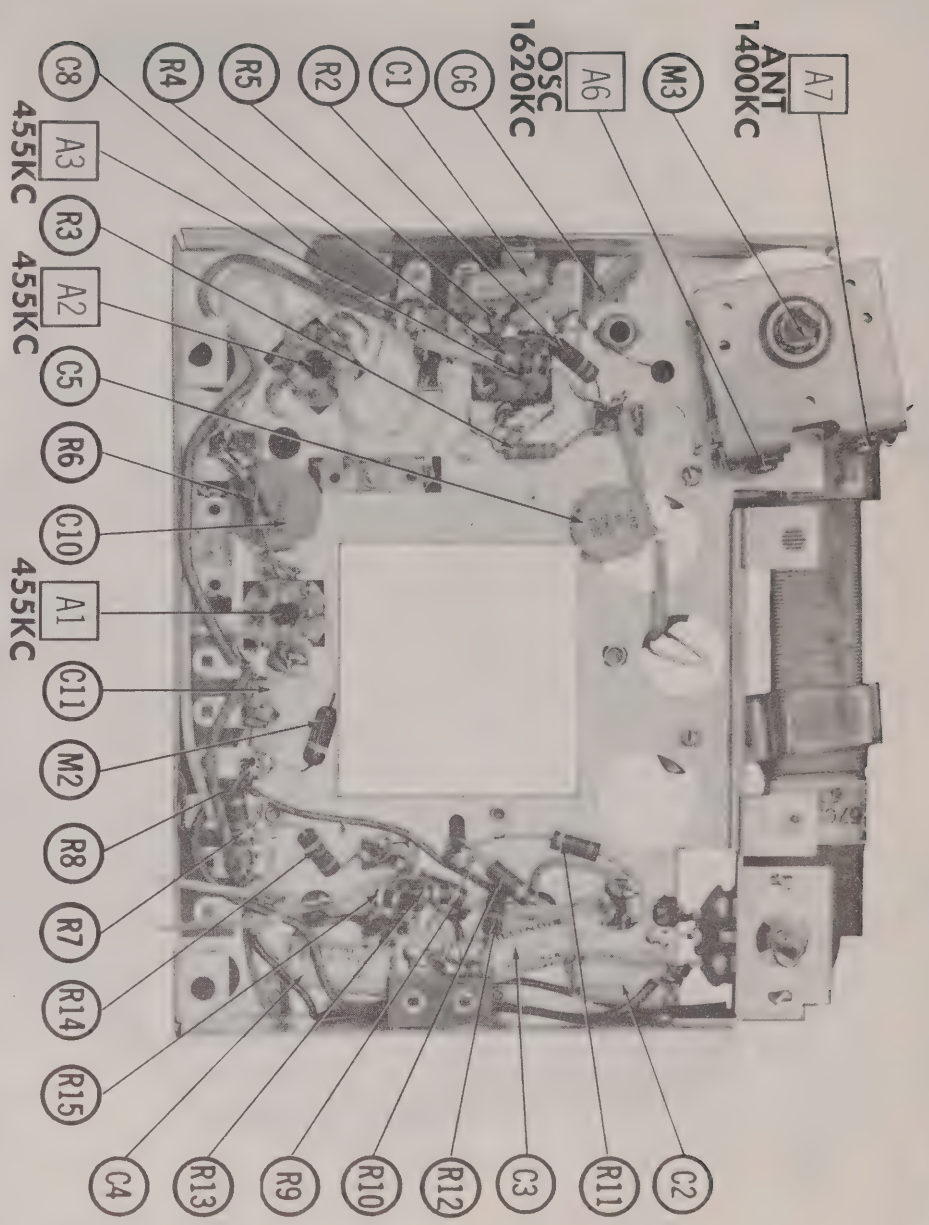
OSCILLATOR INJECTION VOLTAGE ADJUSTMENT

Oscillator injection voltage should be checked if the mixer-osc. (X1) transistor is replaced, if receiver operation is unsatisfactory when the supply voltage drops to approximately 4 volts, if the receiver lacks sensitivity near the low frequency end of the dial, or if "squaging" is present near the high end of the dial.

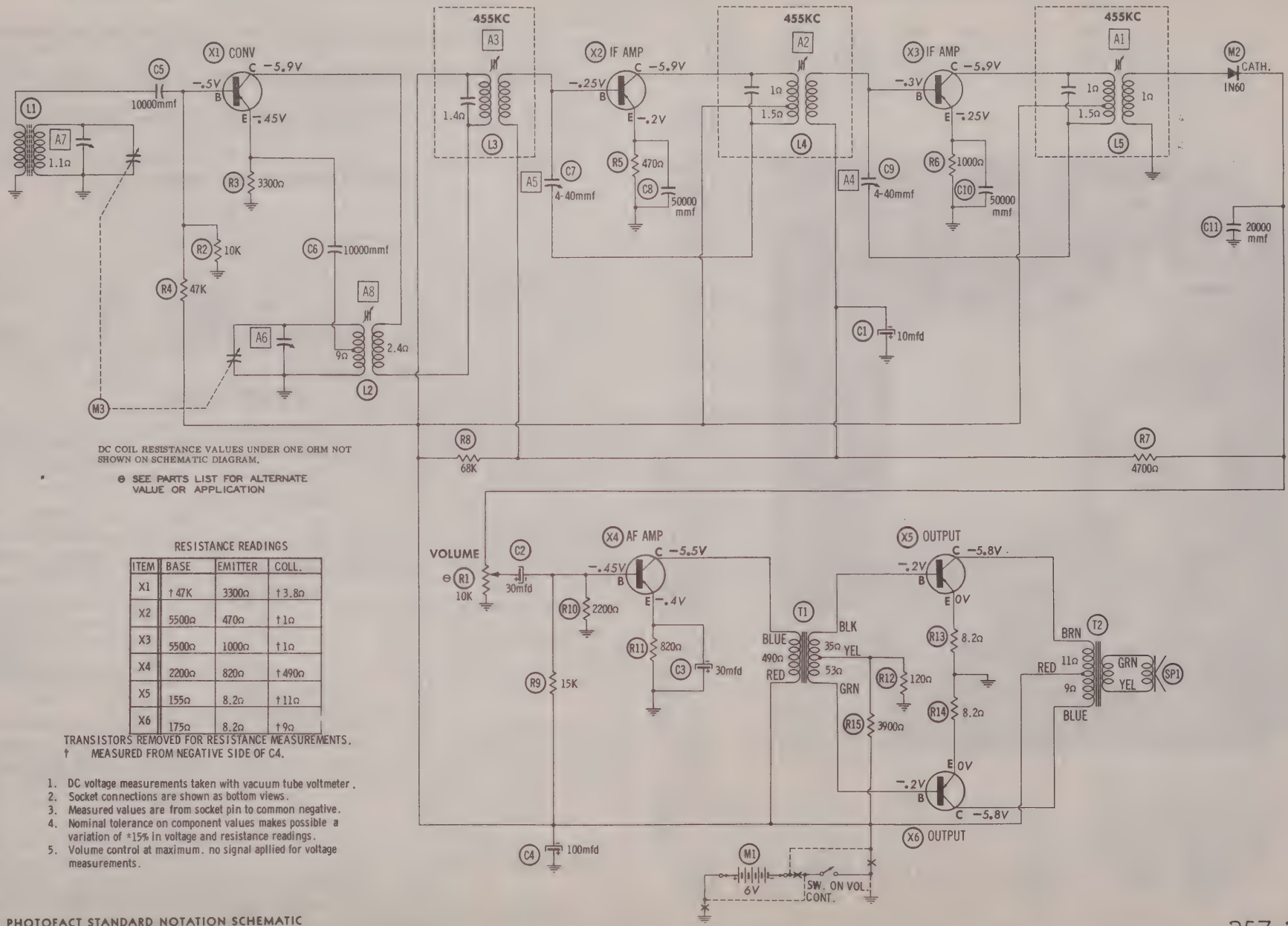
To measure the injection voltage, use a power source of 6 volts DC and connect a sensitive RF voltmeter across R3. The meter should indicate 60 millivolts with the tuning gang closed and should not exceed 150 millivolts with the tuning gang open.

If the injection voltage is not within the approximate limits, loosen the wax seal on the oscillator coil coupling winding and adjust the winding (by sliding) until the readings fall within the limits. Reseal the winding.

CHASSIS—BOTTOM VIEW



HALLICRAFTERS MODEL TR-88



DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

ITEM	BASE	EMITTER	COLL.
X1	†47K	3300Ω	†3.8Ω
X2	5500Ω	470Ω	†1Ω
X3	5500Ω	1000Ω	†1Ω
X4	2200Ω	820Ω	†490Ω
X5	155Ω	8.2Ω	†11Ω
X6	175Ω	8.2Ω	†9Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM NEGATIVE SIDE OF C4.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal apllied for voltage measurements.

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KNIGHT
MODEL 93SZ682

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE S..
DENVER, COLORADO

KNIGHT
MODEL 93SZ682

KNIGHT
MODEL 93SZ682

TRADE NAME	Knight Model 93SZ682
SUPPLIER	Allied Radio Corp., 100 N. Western Ave., Chicago 80, Illinois
TYPE SET	AC Operated 5 Channel 30 Watt Audio Amplifier
TUBES (Six)	Types 6SC7 Preamplifier, 6SC7 Mixer, 6SC7 AF Amp. - Phase Inv., (2) 6L6G Output, 5U4G Rectifier
POWER SUPPLY	105-130 Volts AC-50/60 Cycles RATING 1.18 Amp. @ 117 Volts AC (125 Watts)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

KNIGHT
MODEL 93SZ682

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	MIC 1 Preamplifier — MIC 2 — Mag Preamplifier	6SC7	
V2	Mixer	6SC7	
V3	AF Amp. - Phase Inv.	6SC7	
V4	Output	6L6G	
V5	Output	6L6G	
V6	Rectifier	5U4G	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450		AFH3-41	C0320	FP396-2	TMT-36	Q-055	TVL-3783
B	▲10	450							
C	■10	450							
C2	8	450		PRS450V8	BR845	TC71	TD-8-450	FM-4508	TVA-1704
C3	35	50		PRS150V40	BR505	TC39	TD-50-50	FM-0550	TVA-1308

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

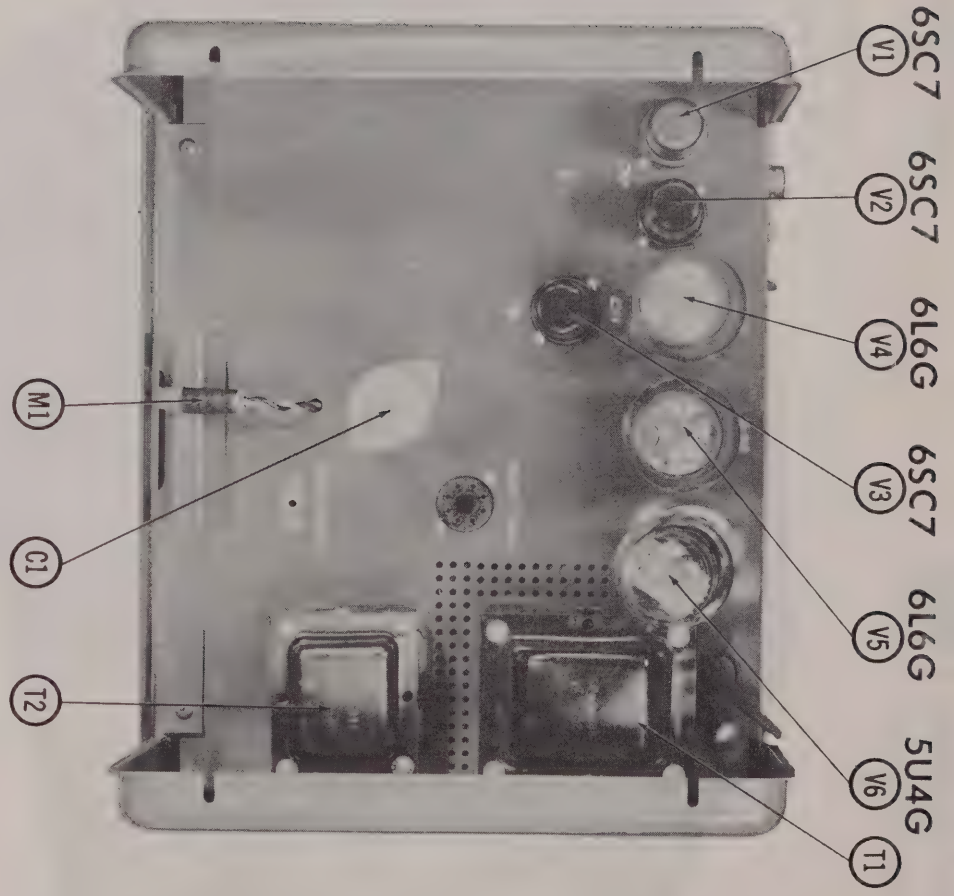
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C5	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C6	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C7	4700			BPD-0047	DD-472	K079	ED-0047	UC-5247	5HK-D47	
C8	.01	600		BPD-01	DD-103	CUB6S1	ED-01	GEM-611	6TM-S1	
C9	.047	600		BPD-05	DD-503	CUB6S47		GEM-6147	6TM-S47	
C10	.047	600		BPD-05	DD-503	CUB6S47		GEM-6147	6TM-S47	
C11	39			1469-000039		5R5Q39			MS-439	
C12	.0033	600		BPD-0033	D6-332	CUB6D33	ED-0033	GEM-6233	6TM-D33	
C13	220			1469-00022		5R5T22			MS-322	Note #1
C14	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C15	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	
C16	.05	600		BPD-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C17	.047	600		BPD-05	DF-503	CUB6S47		GEM-6147	6TM-S47	

Note #1. Some Versions Use 330MMF In This Application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½		AB-59	A47-500K-S	Q11-133	U50	Phono
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
R2A	500K	½		AB-59	A47-500K-S	Q11-133	U50	MIC 2-Mag
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1	SWE-12	76-1	US-26	
R3A	500K	½		AB-60	A47-500K-Z	Q13-133	U48	MIC 1
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	
R4A	500K	½		AB-60	A47-500K-Z	Q13-133	U48	Tone
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	KNIGHT PART No.	IRC PART No.	
R5	10Meg			BTS-10Meg	
R6	220K			BTS-220K	
R7	10Meg			BTS-10Meg	
R8	100K			BTS-100K	
R9	220K			BTS-220K	
R10	47K			BTS-47K	
R11	100K			BTS-100K	
R12	22K			BTS-22K	
R13	180K			BTS-180K	
R14	1800Ω			BTS-1800	
R15	1.5Meg			BTS-1.5Meg	
R16	470K			BTS-470K	
R17	10K			BTS-10K	
R18	470K			BTS-470K	
R19	470K			BTS-470K	
R20	1500Ω			BTS-1500	
R21	10K			BTS-10K	
R22	10K			BTS-10K	
R23	470K			BTS-470K	
R24	200Ω	10		PW10-200	
R25	7500Ω	10		PW10-7500	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	130VAC Tap @ 117VAC @ 1.18A	725VCT @ .135A	5VAC @ 3A	6.3VCT @ 2.9A	LP-0198-B				24R05 ①	

① This Transformer Does Not Provide A Tap On Primary Winding For 130VAC Input.

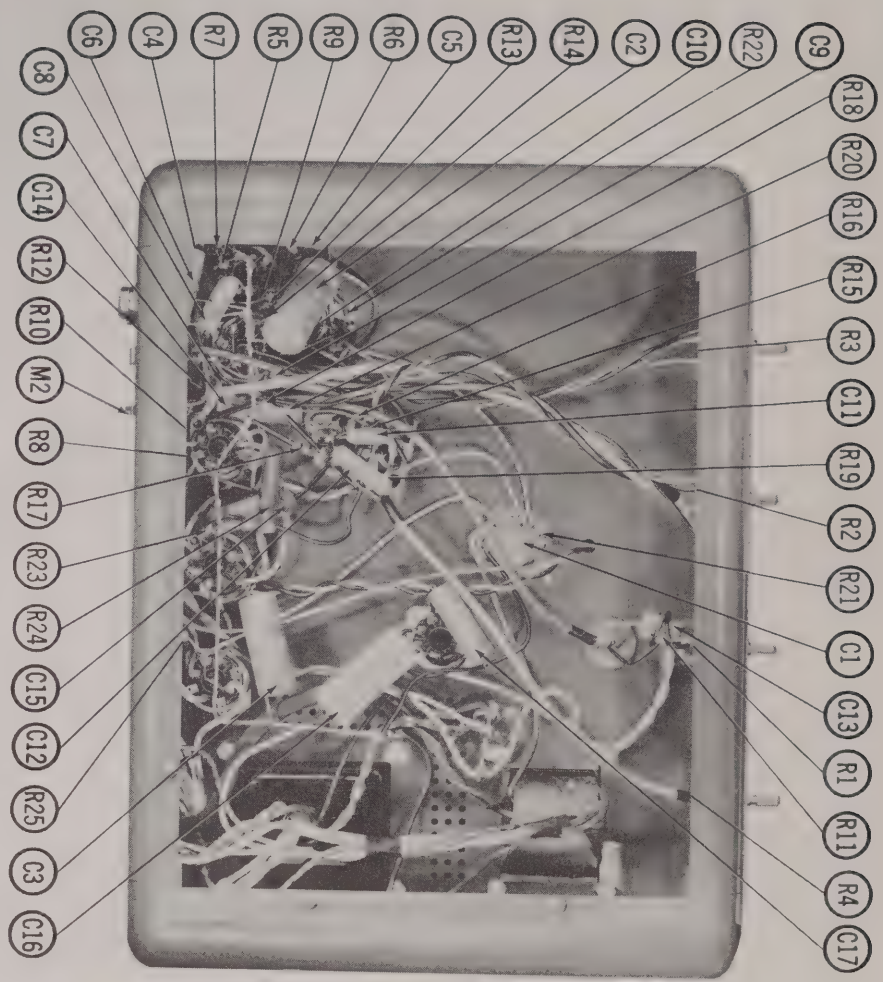
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	8000Ω	500Ω Taps @ 250Ω 167Ω (70V), 16Ω, 8Ω, 4Ω	LO-0093-D						

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M1	Pilot Light		#44
M2	Switch		Mag. - MIC 2, Slide Type (D. P. D. T.)

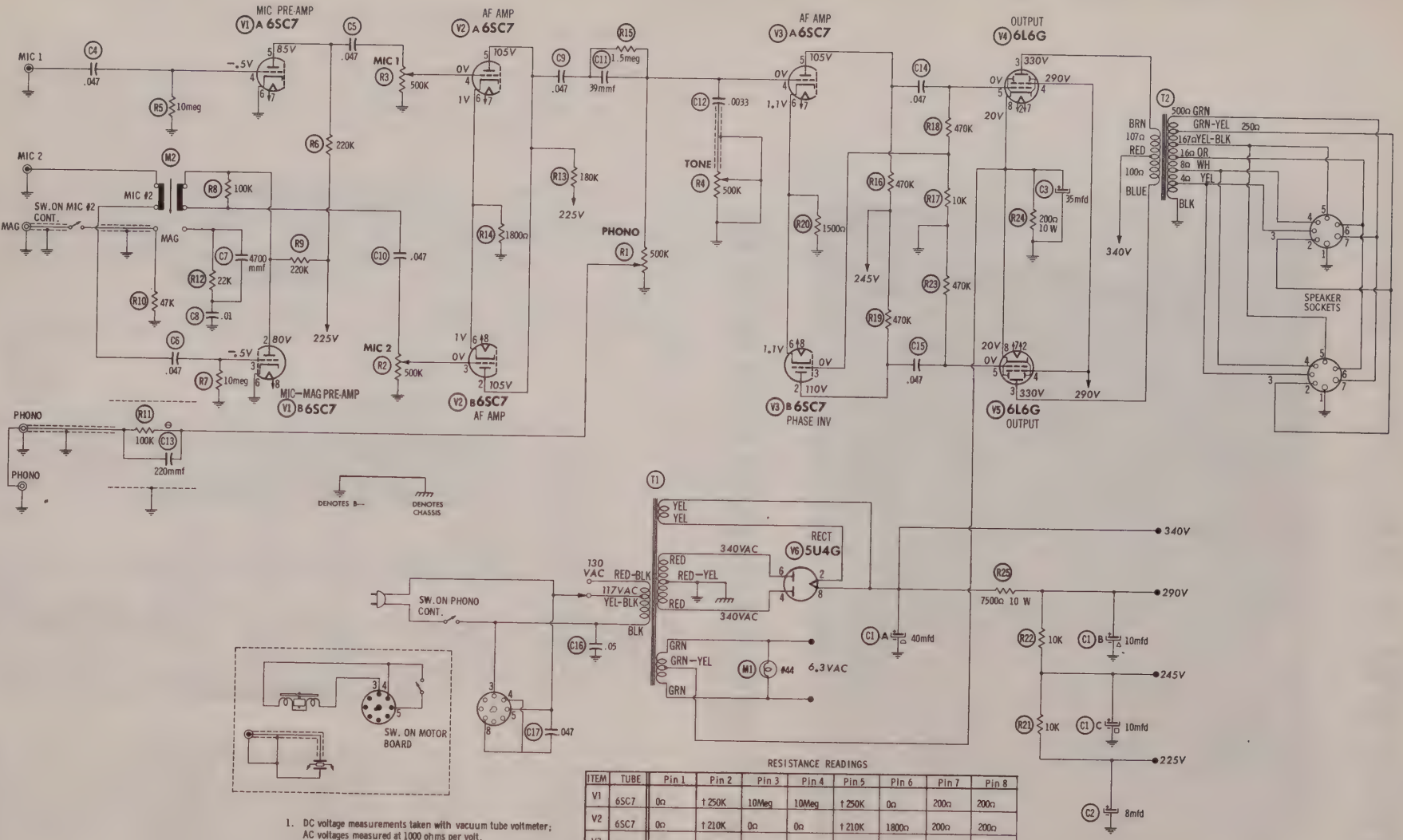
CHASSIS—BOTTOM VIEW



SET 357 FOLDER 4

KNIGHT MODEL 93SZ682

KNIGHT MODEL 93SZ682



ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	6SC7	0Ω	†250K	10Meg	10Meg	†250K	0Ω	200Ω	200Ω
V2	6SC7	0Ω	†210K	0Ω	0Ω	†210K	1800Ω	200Ω	200Ω
V3	6SC7	0Ω	†490K	10K	500K	†490K	1500Ω	200Ω	200Ω
V4	6L6G	0Ω	200Ω	†107Ω	†7500Ω	480K	NC	200Ω	200Ω
V5	6L6G	0Ω	200Ω	†100Ω	†7500Ω	470K	NC	200Ω	200Ω
V6	5U4G	NC	50K	NC	75Ω	TP	65Ω	NC	50K

RESISTANCE READINGS

† MEASURED FROM PIN 8 OF V6.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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MOTOROLA CHASSIS TS-539, Y, TTS-539, Y, VTS-539, Y, WTS-539, Y & Phono Amp. HS-495

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MOTOROLA CHASSIS TS-539, Y, TTS-539, Y, VTS-539, Y, WTS-539, Y & Phono Amp. HS-495

MOTOROLA MODEL A21T33CH (Ch. TS-539)

TRADE NAME	Motorola	MODELS	CHASSIS
		A21K54B, M, A21T33BG, CH, MG, A21T35B, M	TS-539
		YA21K54B, M, YA21T33BG, CH, MG, YA21T35B, M	TS-539Y
		A21C5B, MC, A21F6W(*), A21F6Y(*), A21K60B, M, A21K61MCH, W, A21K62M, CW	TTS-539
		YA21C5B, MC, YA21F6W(*), YA21F6Y(*), YA21K60B, M, YA21K61MCH, W, YA21K62M, CW	TTS-539Y
		A21K59M, MCH, A24K14B, M, A24K15M, MCH, A24T6B, M	VTS-539
		YA21K59M, MCH, YA24K14B, M, YA24K15M, MCH, YA24T6B, M	VTS-539Y
		A21K56B, M, A21K57B, M, MCH, A21K58B, M, A21T36B, M	WTS-539
		YA21K56B, M, YA21K57B, M, MCH, YA21K58B, M, YA21T36B, M	WTS-539Y
		(*) ALSO USES PHONO AMPLIFIER CH. HS-495, AND RECORD CHANGER VM9RC (59K636696). FOR SERVICE INFORMATION ON RECORD CHANGER SEE SIMILAR VM MODEL 1200 IN PHOTOFACT SET 290 FOLDER 11 OR CM-7.	

MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Television Receiver
TUBES	Twenty-one
POWER SUPPLY	105-125 Volts AC, 60 Cycles RATING 225 Watts, 2 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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PHOTOFACT* Folder
*TRADE MARK

MOTOROLA CHASSIS TS-539, Y, TTS-539, Y, VTS-539, Y, WTS-539, Y & Phono Amp. HS-495

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MODEL	CHASSIS
A21T33CH	TS-539

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at one o'clock, proceed in a counter clockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

A. Oval Safety Glass:

1. Pry off nameplate at the top of the safety glass.
2. Remove 2 screws holding retainer at the top.
3. Remove the safety glass.

B. Rectangular Safety Glass:

1. Pull off "snap-in" control cover.
2. Remove 5 push-on type control knobs.
3. Remove 4 screws holding escutcheon and the escutcheon.
4. Remove 4 metal screws holding the retainer at the side.
5. Remove the safety glass.

FOCUS

The focus may be varied by the position of a strap on the base of the picture tube. The strap can be connected between pins 6 and 1 or 6 and 10. Readjust the Ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Set the horizontal hold at the center of its range and adjust the horiz. freq. slug (B1) until the picture synchronizes horizontally. (For location see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (A13) located on top of chassis.

FUSES

Two fuses are used. One for horiz. sweep circuit protection and one for LV power supply protection. (For location see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

MOTOROLA CHASSIS TS-539, Y, TTS-539, Y, VTS-539, Y, WTS-539, Y & Phono Amp. HS-495

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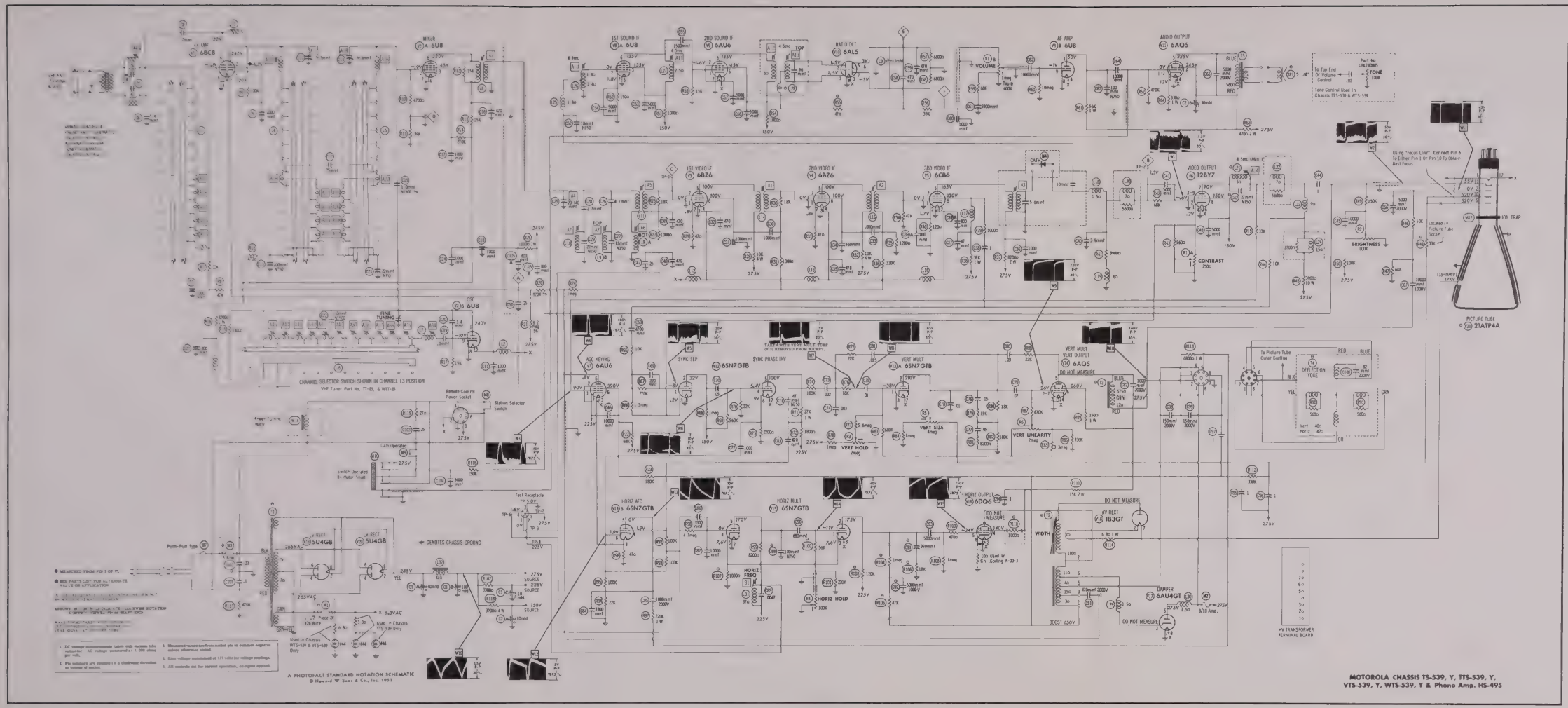
MOTOROLA CHASSIS TS-539, Y, TTS-539, Y, VTS-539, Y, WTS-539, Y & Phono Amp. HS-495
MOTOROLA CHASSIS TS-539, Y, TTS-539, Y, VTS-539, Y, WTS-539, Y & Phono Amp. HS-495
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
DENOTES CHASSIS GROUND
PICTURE TUBE 21ATP4A
ION TRAP
DO NOT MEASURE
BOOST 650V
HV TRANSFORMER TERMINAL BOARD

TUBE PLACEMENT CHART

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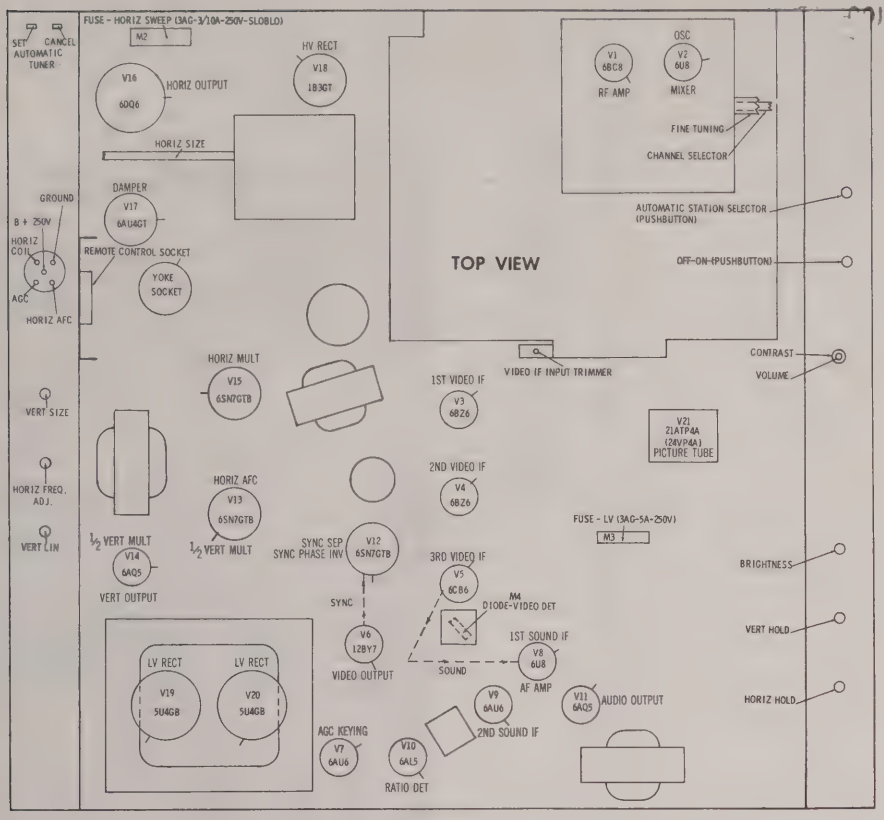


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Fuse (M1, M3), V19, V20**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, Diode (M4), V7**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V21**
Has pic, no sound - **V8, V9, V10, V11**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V12**
No horiz. sync - **V12, V13**
No vert. or horiz. sync - **V12**

SWEEP FAILURE
No raster, has sound - **V13, V15, V16, V17, V18, V21, Fuse (M2)**
No vertical deflection - **V13, V14**
Poor vert. linearity or foldover - **V13, V14**
Poor horiz. linearity or foldover - **V15, V16, V17**
Narrow picture - **V15, V16, V17, V19, V20**
Vert. off freq. - **V13, V14**
Horiz. off freq. - **V15**

CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

MOTOROLA CHASSIS TS-539, Y, TTS-539, Y,
VTS-539, Y, WTS-539, Y & Phono Amp. HS-495

CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To eliminate horizontal interference, remove the yoke plug and connect an 1800 ohm 40 watt resistor from pin 3 to pin 5 of the service test receptacle.

VIDEO IF ALIGNMENT

Set the contrast control fully counter clockwise.
Disable the local oscillator by shorting pin 8 of V3 to chassis with a short lead.
If the sweep generator has no built-in marker, loosely couple the output of an accurately calibrated AM generator to the video IF strip.
If the coils have two points of resonance, the correct setting are with the cores away from the center of the coil forms so as not to affect the coupling between the coil and trap windings.
Connect the negative lead of a 6 volt bias supply to point Ⓐ. Positive to chassis.
Attenuate sweep generator output to maintain between 1 and 2 volts peak to peak on the scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	001MFD	High side to point Ⓚ. Low side to chassis	44 MC (10MC Swp)	42.25MC	13	Vert. Amp thru 47K to point Ⓓ. Low side to chassis	A9	Preset A9 to maximum clockwise rotation being careful not to disengage it from coil form. Adjust A9 to place 42.25MC at 80% on response curve as in Fig. 1.
2.				45.75MC			A2, A3	Adjust A2 to place 45.75MC at 70% on high side of response curve. Simultaneously adjust A3 for flat top and symmetrical response similar to Fig. 1.
3.	"	High side to point Ⓚ. Low side to chassis	"	41.4MC 42.25MC 45.75MC 47.25MC	"	"	A4, A5, A6, A7	Adjust A4 and A5 to place markers (42.25MC and 45.75MC)as in Fig. 2. Adjust A5 for MINIMUM tilt. Increase generator output to observe 41.4MC trap notch. Adjust A7 to place 41.4MC marker in trap notch as in Fig. 3.
4.	"	"	"	"	"	"	A7, A8, A9	Adjust for response curve similar to Fig. 3, with markers correctly positioned as shown in Fig. 3. A7 affects the 41.4MC marker A8 affects the 47.25MC marker. A9 is used to adjust the 43.25MC and 45.75MC markers and the tilt. Remove short from pin 8 of V3.

SOUND IF ALIGNMENT

Turn the contrast control fully clockwise.
If a 4.5MC signal of crystal accuracy is not available, a TV station signal may be used.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.005MFD	High side to point Ⓚ. Low side to chassis.	4.5MC (unmod)	Any unused channel.	DC probe to point Ⓓ. Common to chassis.	A10, A11, A13	Adjust for maximum deflection with the VTVM set to 8 volt scale. Attenuate generator as necessary.
6.	"	"	"	"	DC probe to point Ⓓ. Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

Set the contrast control fully clockwise

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.005MFD	High side to point Ⓚ. Low side to chassis.	4.5MC (400% 30% AM Mod.)	Any non-interfering channel.	DC probe thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Low side to chassis.	A14	Adjust for MINIMUM deflection on VTVM.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a local TV station. Adjust the fine tuning control until a noticeable 4.5MC beat appears in the picture. Adjust A14 for MINIMUM beat in the picture. Adjust so that the core is approximately centered between the two points where the beat appears in the picture.

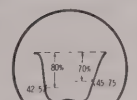


FIG. 1

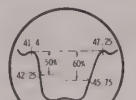


FIG. 2

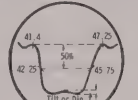


FIG. 3

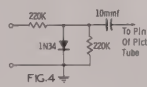


FIG. 4

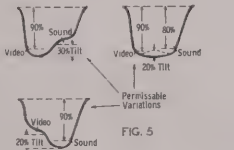


FIG. 5

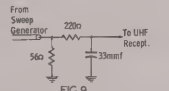


FIG. 9

FIG. 6

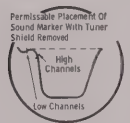


FIG. 7

VHF OSCILLATOR ADJUSTMENTS

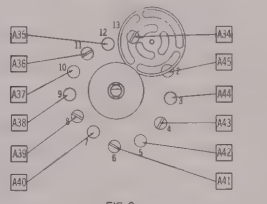


FIG. 8

FIG. 10

VHF SP AND MIXER ALIGNMENT

Adjust the oscilloscope for a 2 inch deflection with 1.4 volt input to the scope.
Set the contrast control fully counter clockwise.
Disable the local oscillator by shorting pin 9 of V2 to chassis with a short lead.
Connect a clip lead from point A to chassis.
If the sweep generator has no built-in marker, loosely couple a separate marker generator to the antenna terminals.
Adjustments A19 thru A33 are adjusted by expanding or compressing the coil turns.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp thru 47K to point Ⓓ. Low side to chassis	A18, A18	Preset adjustments A17 and A18 at mid-capacity. Preset A48 for maximum inductance. (Core fully clockwise. Adjust A18 and A18 for maximum amplitude and response similar to Fig. 5.
9.	"	"	177MC (10MC Swp)	175.25MC 179.75MC	7	"	A17, A18	Adjust for maximum amplitude, correct tilt and correct marker positions as in Fig. 5.
10.	"	"	207MC (10MC Swp) 201MC (10MC Swp) 196MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp)	205.25MC 209.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC	12 11 10 9 8	"		Check for proper response curve on each channel. If response is not within limits on each channel, repeat steps 8 and 9. If necessary, make compromise adjustments of A18 thru A18.
11.	"	"	99MC (10MC Swp)	97.25MC 101.75MC	6	"	A18, A30, A31	Adjust A19, A30 and A31 in this order for response curve similar to Fig. 5. Adjust A19 and A30 for correct marker positions Adjust A31 for maximum gain and MINIMUM tilt.
12.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	A32, A33, A34	Adjust for response similar to Fig. 5. Adjust A33 and A33for correct marker positions and A34 for maximum gain and MINIMUM tilt.
13.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A35, A36, A37	Adjust for response similar to Fig. 5. Adjust A35 and A36 for correct marker positions and A37 for maximum gain and MINIMUM tilt.
14.	"	"	53MC (10MC Swp)	51.25MC 55.75MC	3	"	A38, A39, A39	Adjust for response similar to Fig. 5. Adjust A38 and A39 for correct marker positions and A39 for maximum gain and MINIMUM tilt.
15.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A31, A32, A33	Adjust for response similar to Fig. 5. Adjust A31 and A32 for correct marker positions and A33 for maximum gain and MINIMUM tilt. Remove all test equipment and connections

VHF OSCILLATOR ALIGNMENT

Connect bias as under "Video IF Alignment".
Use only enough sweep generator output to provide usable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the center of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp) 207MC (10MC Swp) 201MC (10MC Swp) 195MC (10MC Swp) 189MC (10MC Swp) 183MC (10MC Swp) 177MC (10MC Swp) 85MC (10MC Swp) 79MC (10MC Swp) 69MC (10MC Swp) 63MC (10MC Swp) 57MC (10MC Swp)	211.25MC 215.75MC 205.25MC 209.75MC 199.25MC 203.75MC 193.25MC 197.75MC 187.25MC 191.75MC 181.25MC 185.75MC 175.25MC 179.75MC 83.25MC 87.75MC 77.25MC 81.75MC 67.25MC 71.75MC 61.75MC 65.75MC 55.25MC 59.75MC	13 13 11 10 9 8 7 6 5 4 3 2	Vert. amp thru 47K to point Ⓓ. Low side to chassis.	A34 A35 A36 A37 A38 A39 A40 A41 A42 A43 A44 A45	Adjust to place sound marker in trap notch as in Fig. 7. Video marker should fall at 50%.

45MC TRAP ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 120Ω carbon resistors	Across VHF antenna terminal with 120Ω in each lead.	44MC (10MC Swp)	44.0MC	2	Vert. amp thru 47K to point Ⓓ. Low side to chassis.	A46	Increase sweep generator output to produce visible marker on scope. Adjust A46 for MINIMUM response at 44.0MC.

UHF - IF ALIGNMENT

Unplug UHF tuner output cable from the VHF tuner.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18.	Fig. 9	High side to UHF input receptacle thru matching network (Fig. 9). Low side to chassis.	44MC (10MC Swp)	41.25MC 43.75MC	UHF	Vert. amp. to point Ⓓ. Low side to chassis.	A47, A48, A49	Adjust A47 and A48 for correct marker position. Adjust A49 for proper tilt and maximum gain as in Fig. 10.

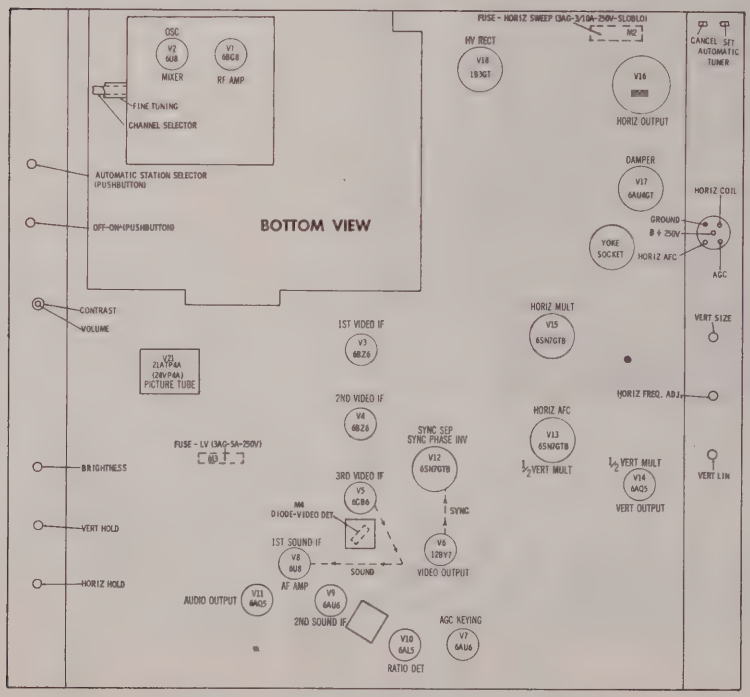
UHF ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BC8	†1500Ω	INF	INF	0Ω	.1Ω	INF	1.6Meg	0Ω	0Ω
V2	6U8	†12K	44K	†270K	0Ω	.1Ω	†16K	0Ω	0Ω	15K
V3	6BZ6	300K	47Ω	0Ω	.1Ω	†10K	†10K	0Ω		
V4	6BZ6	300K	47Ω	0Ω	.1Ω	†10K	†10K	0Ω		
V5	6CB6	1000Ω	120Ω	.1Ω	0Ω	†8200Ω	†39K	0Ω		
V6	12BY7	•110Ω	70K	0Ω	0Ω	0Ω	.1Ω	†3900Ω	†3900Ω	0Ω
V7	6AU6	†37K	†3300Ω	.1Ω	.5Ω	1Meg	†68K	†3300Ω		
V8	6U8	†56K	3.2Ω	†5000Ω	.1Ω	0Ω	†5000Ω	150Ω	0Ω	10Meg
V9	6AU6	15K	0Ω	.1Ω	0Ω	†5000Ω	†5000Ω	0Ω		
V10	6AL5	1Meg	1Meg	.1Ω	0Ω	6800Ω	0Ω	6800Ω		
V11	6AQ5	470K	330Ω	0Ω	.1Ω	†1000Ω	†517Ω	470K		
V12	6SN7GTB	1.7Meg	†1Meg	110Ω	22K	†33K	2200Ω	.1Ω	0Ω	
V13	6SN7GTB	•1.5Meg	‡1Meg	0Ω	320K	22K	120K	.1Ω	.5Ω	
V14	6AQ5	•1.4Meg	0Ω	0Ω	.1Ω	†600Ω	†200Ω	•1.4Meg		
V15	6SN7GTB	•60K	†120K	1000Ω	5Meg	†11K	1000Ω	0Ω	.1Ω	
V16	6DQ6	TP	.1Ω	TP	†16K	1Meg	TP	0Ω	0Ω	TOP CAP ‡13Ω
V17	6AU4GT	NC	TP	¶	NC	†47Ω	TP	0Ω	.1Ω	
V18	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡193Ω
V19	5U4GB	NC	¶	NC	7Ω	NC	7Ω	NC	¶	
V20	5U4GB	NC	¶	NC	7Ω	NC	7Ω	NC	¶	
V21	21ATP4A	0Ω	80K	Pin 6 ‡360K	Pin 10 ‡360K	Pin 11 •170K	Pin 12 .1Ω			

† MEASURED FROM PIN 2 OF V20.
‡ MEASURED FROM PIN 3 OF V17.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
NC NO CONNECTION
TP TIE POINT



TUBE PLACEMENT CHART

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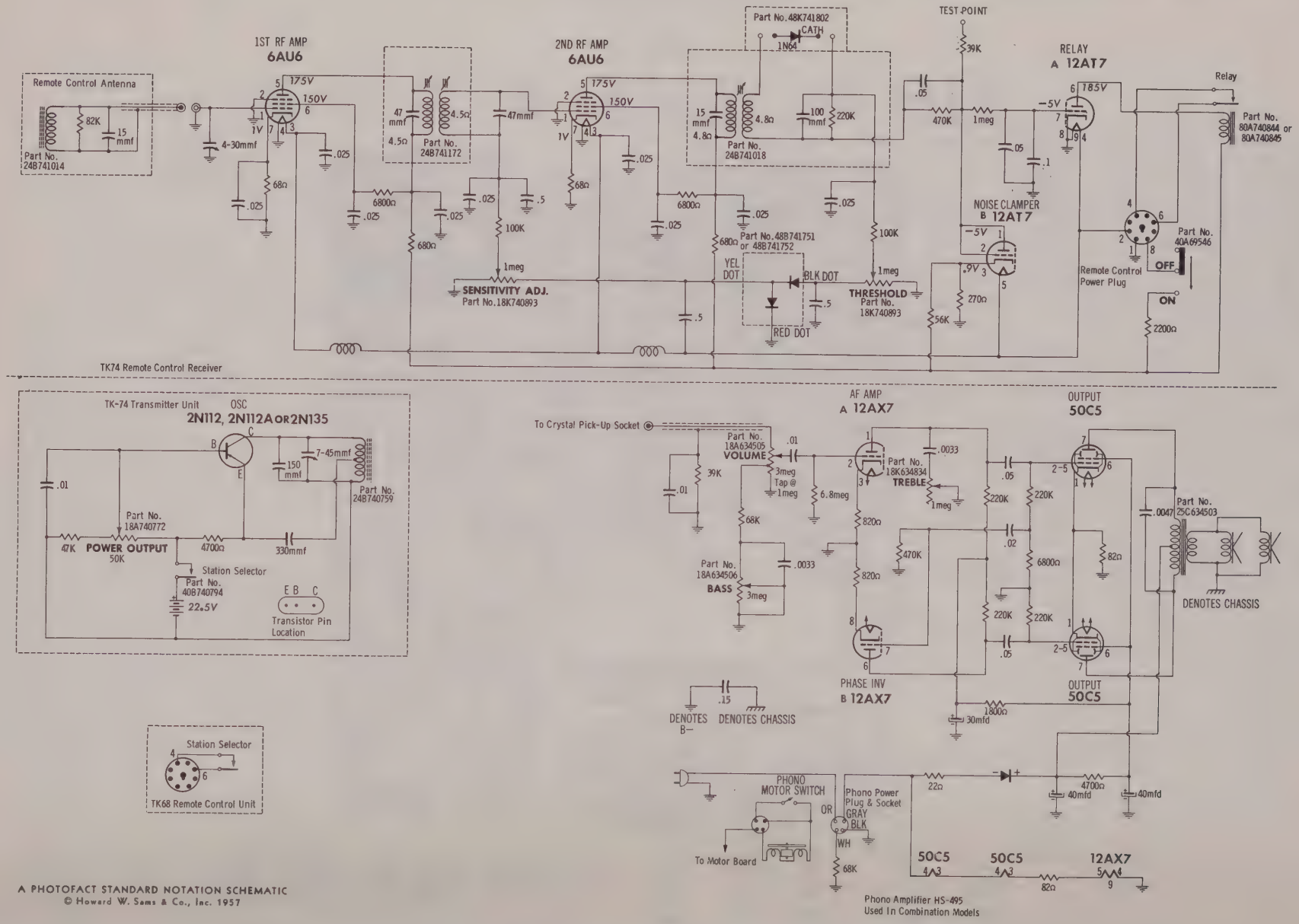
CHASSIS TOP VIEW

MOTOROLA CHASSIS TS-539, Y, TTS-539, Y, VTS-539, Y, WTS-539, Y & Phono Amp. HS-495



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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REMOTE CONTROL & PHONO AMP. SCHEMATIC

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BC8	
V2	Mixer-Oscillator	6U8	
V3	1st. Video IF Amp.	6BZ6	
V4	2nd. Video IF Amp.	6BZ6	
V5	3rd. Video IF Amp.	6CB6	
V6	Video Output	12BY7	
V7	AGC Keying	6AU6	
V8	1st. Sound IF - AF Amp.	6U8	
V9	2nd. Sound IF Amp.	6AU6	
V10	Ratio Det.	6AL5	

ITEM No.	USE	TYPE	NOTES
V11	Audio Output	6AQ6	
V12	Sync Sep. -Sync Phase Inv.	6SN7GTB	
V13	Horiz. AFC-Vert. Mult.	6SN7GTB	
V14	Vert. Mult. -Vert. Output	6AQ5	
V15	Horiz. Mult.	6SN7GTB	
V16	Horiz. Output	6DQ6	
V17	Damper	6AU4GT	
V18	HV Rectifier	1B3GT	
V19	LV Rectifier	5U4GB	
V20	LV Rectifier	5U4GB	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	MOTOROLA PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V21	21ATP4A	21ATP4 ②	21ATP4A/21ATP4②	21ATP4A① 21ATP4/ 21ATP4A①	① Silver screen "85"
	24VP4A	24VP4A ②	24VP4 ②	24VP4A ① 24VP4	

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ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■40	400	23B738917	AFH3-93-45	CO370	FP378	TMD-92	Q-017	R2383*
B	■100	400			BR1045	TC72	TD-100-45	FM-4510	
C	▲10	400							
C2A	▲10	400	23B738918	AFH2-43-30	BO410	FP259	TMD-42	T-135	TVL-2663
B	■30	400							
C3	3	50	23A690543	PRS50V2	BBR4-50	TC30	TD-4-50	FM-1504	TE-1303

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	47		21R114207	NP0-SI 47	TCZ-47	C10Q47C	TCO-47	UC-5447	5TCC-Q47	
C5	150		21R124608	NP0-SI 150	TCZ-150	L10T15	TCO-150	UC-5315	5TCC-T15	
C6	5.6		21A732738							
C7	1000		21A739920	EF-001	MFT-1000				503C-D1	
C8	2.2		21R115948	NP0-SI 2.2	TCZ-2R2	C10V22C	TCO-2.2		5TCCB-V22	
C9	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C10	.5-3		21K735985		829-3		3115-D	CT565A		
C11	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C12	.75		21K735623							
C13	100		21R120577	N750-SI 100	TCN-100	C10T1U	TC7-100	NT-531	5TCU-T1	N750
C14	.5-3		21K735985		829-3		3115-D	CT565A		
C15	1.0		21R124552							N1500
C16	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C17	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C18	1000		21A739920	EF-001	MFT-1000				503C-D1	
C19	10		21R124710	NP0-SI 10	TCZ-10	C10Q1C	TCO-10	ZT-541	5TCC-Q1	
C20	3.4		21R124489	NP0-SI 3.3	TCZ-3R3			ZT-5533	5TCCB-V33	
C21	22		21R124554	NP0-SI 22	TCZ-22	C10Q22C	TCO-22		5TCC-Q22	NP0
C22	1.0		21R114071							N1500
C23	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C24	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C25	20-140		20A736287							
C26	4.7		21R115954	NP0-SI 4.7	TCZ-4R7	C10V47C	TCO-4.7	ZT-5547	5TCCB-V47	
C27	18		21R120578							N150
C28	2.7		21R115950							
C29	22		21R120539							N150
C30	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C31	1000		21K738352	EF-001	MFT-1000				503C-D1	
C32	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C33	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C34	560		21R120936		DD-561		ED-560	UC-5356	5GA-T56	
C35	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C36	1000		21R115386	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C37	47		21R115593	BPD-000047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C38	.1	200	8R121573	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C39A	800		21R400943	BPD-0008	DD-801	L10T8	ED-0008			
B	800			BPD-0008	DD-801	L10T8	ED-0008			
C40	3.9		21R115953			C10V4C				
C41	5000		21A738298	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C42	27		21R119896							N150 ①
C43	5000		21A738298	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C44	.1	400	8R121006	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C45	10000		21R124832	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C46	10000		21R121946	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C47	.25	100	8K122045	P288N-25		CUB2P25		GEM-2025	2TM-P25	
C48	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C49	470		21R114554	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C50	.25	100	8K122045	P288N-25		CUB2P25		GEM-2025	2TM-P25	
C51	470	2000	21R121478	HVD-30-470	DD30-471	HVB20T47		DC30347	60HKD-T47	
C52	18		21R120578							N150
C53	5000		21R115312	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C54	5000		21R115312	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C55	1500		21K738752	BPD-0015	DD-152	BYA10D15	ED-0015	DC5215	5HK-D15	
C56	5000		21R115312	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C57	5000		21R115312	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C58	470		21K121797	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C59	470		21K121797	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C60	1000		21K738352	EF-001	MFT-1000			DC521	503C-D1	
C61	3300		21R120422	BPD-0033	D6-332	BYA10D33	ED-0033	UC-5233	5GA-D33	
C62	10000		21R482726	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C63	100		21R400537	N750-SI 100	TCN-100	C10T1U	TC7-100	NT-531	5TCU-T1	N750

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No	SPRAGUE PART No	NOTES
			REPLACEMENT DATA							
C84	10000		21R402726	BPD-01	DD-103	BYA85J	ED-01	DC51U	51K-51	
C85	5000	2000	21R-30083							
C86	5000	3000	21R-30083							
C87	10000	1000	21R402789							
C88	4700		21R-0149	BPD-0047	DD-472	BYA102G47	ED-0047	UC-5247	5GA-D47	
C89	220		21R224830	BPD-0001	DD-221	L10T22	ED-220	UC-5222	5GA-T22	
C90	05	600	21R12567	BPD-05	DF-503			GEM-415	4TM-S5	
C91	47		21R12422	NT80-S1 47	TCN-47	CSH247U	TCT-47	NT-5447	5TCU-Q47	N750
C92	1000		21R12576	BPD-001	DD-102	BYA85H	ED-1000	DC532	51K-D1	
C93	003	600	21R12565	BPD-002	DD-203	BYA102G	GP-2000	GEM-824	4TM-D3	
C94	005	600	21R12569	BPD-0033	DD-302	CUB03D	GP-3000	GEM 843	6TM D5	
C95	01	600	8A73329B9	BPD-01	DD-103	CUB45-	GP-10000	GEM 411	4TM-S1	
C96	05	600	21R12568	BPD-05	DF-503	CUB05D		GEM 415	6TM-S5	
C97	05	200	21R-1305	BPD-05	DF-503	CUB45S		GEM-215	2TM-S5	
C98	03	600	21R-12585	BPD-03	DF-303	CUB05U	ED-01	GEM-613	6TM-S3	
C99	02	600	8A73329	BPD-02	DF-302	CUB05J	ED-03	GEM 612	6TM-S2	
C100	03	600	8A73329A	BPD-03	DF-303	CUB05D		GEM 613	6TM-S3	
C81	05	400	8A73742A	BPD-015	DF-503	CUB45U5	ED-015	GEM 415	4TM-S15	
C82	4000	3000	21R124156	HVB-30-1000		HVB30D2		DC532	30KSD-D1	
C83	470		21R12767	BPD-0047	DD-471	BYA102F47	ED-470	UC-5247	5GA-T47	
C84	3300		21R-20422	BPD-0033	DE-332	BYA102G3	ED-0033	UC-5233	5GA-D33	
C85	1000	3000	21R124561	HVB-30-1000		HVB30D2		DC532	30KSD-D1	
C86	3300		21R-20422	BPD-0033	DE-332	BYA102G3	ED-0033	UC-5233	5GA-D33	
C87	1000		21R-88728	BPD-01	DD-103	BYA85L	ED-01	DC51U	51K-D1	
C88	100		21R400537	NT80-S1 100	TCN-100	CSH7U	TCT-100	NT 100	5TCU-T1	N750
C89	0047	400	8A734634	BPD-0047	DD-472	CUB45D47	GP-4700	GEM-4247	4TM D47	
C90	500		21R-30084	BPD-0068	DD-681	L10T68	ED-680	UC-5368	5GA-T68	
C91	390		21R735757			L10T39	ED-390	UC-5339	5GA-T39	
C92	1A200	1000	1A2A3003	BPD-005	DD-502	BYA102E	ED-005	DC525	5HK-D5	
C93	5000		1A736298	BPD-005	DD-502	BYA102E	ED-005	DC525	5HK D5	
C94	4	400	P458N-P1	BPD-04	DF-104	CUB45P-		GEM-401	4TM-P1	
C95	1	600	P458N-P1	BPD-04	DF-104	CUB45N		GEM-601	6TM-P1	
C96	1	600	21R12859	P458N-P1	DF-104	CUB45P-		GEM-601	6TM-P1	
C97	2	200	21R12575	P288N-1	DF-104	CUB45P-		GEM-201	2TM-P1	
C98	150	2000	21R-12304	HVB-30-150	DD50-150	HVB30T15			30GA-T15	
C99	150	3000	21R-12914	HVB 30-150	DD30-150	HVB30T15			30GA T15	
C100	62	2000	21R-20150		DD30 820	HVA30Q82				
C101	1	400	21R12906	P458N-P1	DF-104	CUB45P1		GEM-401	4TM-P1	
C102	03	600		BPD-03	DF-303	CUB05D		GEM-613	6TM-S3	
C103	25	400	21R12788	P488N-25		CUB4P25		GEM-4025	4TM-P25	
C104	5000		21R115131	BPD-005	DD 502	BYA102E	ED-005	DC525	5HK-D5	
C109A	800		21R400943	BPD-0008	DD 801	L10T8	ED-0008			
B	800			BPD-0008	DD-801	L10T8	ED-0008			

1 In chassis coding A-00-1 a 133MMF is used in this application (Part #21R119121)
In chassis coding A-00-3 a 120MMF is used in this application (Part #21R122430)
Some versions use a .1MFD capacitor in this application.
Not used in chassis coding A-00-3.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No	INSTALLATION NOTES
			REPLACEMENT DATA					
R1A	250Ω		18K740563	F1-0			UE-51	Contrast
B	1Meg			R2-60				Volume - Tap @ 600K
R2	100K		18K738548				TA-15L	Brightness
R3	2Meg		18K738555				TA-26L	Vert Hold
R4	100K		18K738548				TA-15L	Horiz Hold
R5	4Meg		18K740695					Vert Size
R6	1Meg		18K738555				TA-26L	Vert Lin.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	MOTOROLA PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R7	22K		6R6028	BTS-22K	
R8	47K		6R6056	BTS-47K	
R9	100K		6R6075	BTS-100K	
R10	4700Ω		6R6039	BTS-4700	
R11	39K		6R6047	BTS-39K	
R12	15K		6R24551	BTS-15K	
R13	15K		6R2119	BTS-15K	
R14	270K		6R5414	BTS-270K	
R15	4700		6R3949	BTS-470	
R16	2200Ω	1	6R5401	BTA-2200	
R17	15K		6R2119	BTS-15K	
R18	3300		6R5561	BTS-3300	
R19	33K		6R6013		
R20	930K 5%		6R6429		
R21	6.34meg 5%		6R10414		
R22	68K		6R6074		
R23	180K		6R6444		
R24	1Meg		6R6046	BTS-1Meg	
R25	1000Ω	2	6K478004	BTS-1000	
R26	18K		6R5560		
R27	1000Ω		6R6501		
R28	1.5K	4	17K735297	PW10-1K	
R29	470		6R5550	BTS-47	
R30	18K		6R5561		
R31	1000Ω		6R6501		
R32	10K	4	17K735297	PW10-10K	
R33	47Ω		6R5550	BTS-47	
R34	47K		6R6048		
R35	3300Ω		6R6393	BTS-3300	
R36	330K		6R6045	BTS-330	
R37	3.3Meg	2	6R9728	BTS-3.3Meg	
R38	39K	1	6R6568	BTA-39K	
R39	1000Ω		6R6501	BTS-1000	
R40	150Ω		6R6651	BTS-150	
R41	3900Ω		6R5650	BTS-3900	
R42	68K		6R6074	BTS-68K	
R43	560Ω		6R6391	BTS-560	
R44	10K		6R6393	BTS-10K	
R45	3900Ω	10	17K735257	PW10-3900	
R46	10K		6R6094	BTS-10K	
R47	68K		6R6074	BTS-68K	
R48	33K		6R6013	BTS-33K	Note 1
R49	150K		6R6083	BTS-150K	
R50	100K		6R6031	BTS-100K	
R51	1000Ω		6R6501	BTS-1000	
R52	150Ω		6R6373	BTS-150	
R53	15K		6R6477	BTS-15K	
R54	1000Ω		6R6501	BTS-1000	
R55	47Ω		6R5550	BTS-47	
R56	33K		6R6013	BTS-33K	
R57	6800Ω		6R6425	BTS-6800	
R58	9800Ω		6R6438	BTS-9800	
R59	68K		6R6031	BTS-68K	
R60	10Meg		6R5622	BTS-10Meg	
R61	56K	1	6R24542	BTA-56K	
R62	470K		6R6032	BTS-470K	
R63	470Ω	2	6R2010	BTA-470	
R64	330Ω	1	6R6254	BTA-330	
R65	10K		6R6330	BTS-10K	
R66	5.5Meg		6R3966	BTS-5.5Meg	
R67	270K		6R6414	BTS-270K	
R68	1Meg		6R6046	BTS-1Meg	
R69	560K		6R5697	BTS-560K	
R70	72K		6R6397	BTS-72K	
R71	27K	1	6R6427	BTA-47K	
R72	1800Ω		6R6088	BTS-1800	
R73	2200Ω		6R6089	BTS-2200	
R74	180K		6R6444	BTS-180K	
R75	33K		6K19935	BTS-33K	
R76	18K		6R6591	BTS-18K	
R77	5.5Meg		6K24781	BTS-5.5Meg	
R78	1Meg		6R6046	BTS-1Meg	
R79	15K		6R6477	BTS-15K	
R80	18K		6K123548	BTS-18K	
R81	8200Ω		6R6094	BTS-8200	
R82	180K		6R6444	BTS-180K	
R83	680K		6R6475	BTS-680K	
R84	1Meg		6R6034	BTS-1Meg	
R85	3.3Meg		6R6497	BTS-3.3Meg	
R86	330K		6R6098	BTS-330K	
R87	470K		6R6032	BTS-470K	
R88	22K		6K19935	BTS-22K	
R89	1500	1	6R6530	BTA-150	
R90	560Ω		6K123502		
R91	5600		6K123502		
R92	100K		6R6031		
R93	100K		6R6031		
R94	22K		6R6397	BTS-22K	
R95	100K		6R6031		
R96	47Ω		17K748268	BW½-47	
R97	220K	1	6K12455		
R98	4.7Meg		6R2012	BTS-4.7Meg	
R99	82000		6R2094	BTS-8200	
R100	56K		6R6578		Note 3

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	MOTOROLA PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R101	220K		6R6407	BTS-220K	
R102	2300Ω		6R2089		
R103	120K		6R6631	BTS-120K	Note 4
R104	1Meg		6R6046	BTS-1Meg	Note 5
R105	47K		6R6048		Note 5
R106	18K		6R6591	BTS-18K	Note 6
R107	1000Ω		6R6529	BTS-1000	Note 7
R108	1Meg		6R6046	BTS-1Meg	
R109	470Ω		6R3949	BTS-470	
R110	1000Ω		6R6529	BTS-1000	Note 5
R111	15K	2	6R5722	BTB-15K	
R112	150K		6R6014	BTS-150K	
R113	6800Ω	1	6K124869		
R114	6.8Ω	1	17K648269	BW1-6.8	
R115	27Ω		6R5563	BTS-27	
R116	150K		6R6398	BTS-150K	
R117	470K		6R6577	BTS-470K	
R118	3900Ω	4	17K740922	PW7-3900	

Note 1: Inside picture tube socket
Note 2: In chassis coding A-03 a 47Ω resistor is used in this application.
Note 3: In chassis coding A-00-3 a 47K resistor is used in this application. (Part #6R6048)
Note 4: In chassis coding A-00-3 a 100K resistor is used in this application. (Part #6R6031)
Note 5: Not used in chassis coding A-00-3.
Note 6: In chassis coding A-00-3 a 18K resistor is used in this application. (Part #6R6394).
Note 7: In chassis coding A-00-3 a 1200Ω resistor is used in this application. (Part #6R6383)

TRANSFORMER (POWER)

ITEM No.	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No	Heiffelcron PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
			REPLACEMENT DATA							
T1	117VAC	510VCT	5V	6.3V	35D740084 ①					
		@ 2A	@ 3.45A	@ 0.6A	@ 0.6A					

① Alternate part #35D740783.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	MOTOROLA PART No	Heiffelcron PART No	Merit PART No	RCA TYPE No	Rem PART No	Stancor PART No	Thordarson PART No	Triad PART No
		REPLACEMENT DATA							
T2	Horiz Output Trans.	24K739284 ① 24K739283 ② 24K737818 ③ 24K741938 ④						FLY-125 ⑤	
T3	Vert. Output Trans.	25R738716-C	21900 ⑥	A-2823 ⑥		V316 ⑦	A-8145 ⑦	26872-7 ⑦	A-116X ⑦
T4A	Yoke (90°) Horiz. (23MM)	25R738716-A	21900 ⑥	A-2823 ⑥		V316 ⑦	A-8145 ⑦	26872-7 ⑦	A-116X ⑦
B	Vert. (37.5MM)	24D739275 ⑧	DF907 ⑨	MDF-92 ⑨	235D ⑩	V307 ⑪	DY-A ⑪	Y-2E ⑪	Y-4(NW) ⑪
		48A72145 ⑫ 42A738175 ⑬	DF907 ⑨	MDF-92 ⑨	235D ⑩	V307 ⑪	DY-A ⑪	Y-2E ⑪	Y-4(NW) ⑪ YCL ⑫ CLJ ⑬

① Complete transformer.
② Primary coil for transformer #24K739284.
③ Secondary coil for transformer #24K739284 and transformer #24K741938.
④ Alternate part number.
⑤ Primary coil for transformer #24K741938.
⑥ Use 7 to 1 turns ratio.
⑦ Connect as auto transformer
⑧ Drill new mounting hole(s).
⑨ Cut and tape green lead.
⑩ Yoke rear cover and centering device.
⑪ Yoke clamping device.
⑫ Use original rear cover and centering device.
⑬ Use original horizontal yoke damping network with capacitor (C100) across yoke terminals #3 and #7.
⑭ Connect yoke terminal #3 to yoke plug pin #4, connect yoke terminals #2 and #7 to yoke plug pin #5, yoke terminal #1 to yoke plug pin #6.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL (CONNECTIONS)	Heiffelcron Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rem Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
7						7	
6						6	
5						5	
3						3	
2						2	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC	MOTOROLA PART No.	Heiffelcron PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No	Triad PART No	NOTES
			REPLACEMENT DATA						
T5	4000Ω	3-4Ω	25C738847	ZU07 ①	A-3019	A-3877 ①	28649	S-5Z	① Drill one new mounting hole

SPEAKER

ITEM No.	SIZE	TYPE FIELD	TYPE V C IMP	MOTOROLA PART No.	QUAM PART No.	NOTES
				REPLACEMENT DATA		
SP1	5 1/4"	PM	3-4Ω	50D729234 ①	32A1	① Used in Models A3T33BG, CH, MG, YA3T33BG, CH,
	6"	PM	3-4Ω	50K729980 ②	6A1	MG, AE735B, M, YA3T735B, M, AE756B, M, YA3T36B,
	6"	PM	3-4Ω	50K729778 ③	6A1	M
	5 1/4"	PM	3-4Ω	50K729577 ④	32A1	② Used in Models A3472BG, M, YA3472BG, M
	6" x 9"	PM	3-4Ω	50D739985 ⑤	69A3	③ Used in Models AE735B, MC, AE736M, YA3C5B, MC,
	6" x 9"	PM	3-4Ω	50K740979 ⑥	69A3	YA3C5M
	6" x 9"	PM	3-4Ω	50K741866 ⑦		④ Used in Models AE18G0, MC, AE18G0M, YA18G0B,
	5" x 9"	PM	6-8Ω	50K741867 ⑧		MC, YA18G0M, AE18X1MCB, W, YA18X1MCB, W
	5"	PM	6-8Ω	50K741869 ⑨		⑤ Used in Models A18X57B, M, MCH, YA18X57B, M, MCH
	8"	PM	6-8Ω	50K741870 ⑩		⑥ Used in Models A3452BM, MCH, YA3452BM, MCH
	8"	PM	3-4Ω	50D729233 ⑪	8A2B	⑦ Used in Models A18F9W, YA18F9W
	8"	PM	3-4Ω	50K740985 ⑫	8A2B	⑧ Used in Models AE18Y4B, M, YA18Y4B, M, AE18Y4B,
	8"	PM	6-8Ω	50K740981 ⑬		M, YA18Y4B, M
	8"	PM	6-8Ω	50K740982 ⑭		⑨ Used in Models AE18Y5B, M, YA18Y5B, M, AE18Y9M,
	8"	PM	3-4Ω	50K740984 ⑮	8A2B	MCH, YA18Y9M, MCH
						⑩ Used in Models AE18Y2M, YA18Y2M, AE18X5CW,
						YA18X5CW
						⑪ Used in Models A34X43B, M, T34X44B, M

COILS (RF-IF)

ITEM No	USE	MOTOROLA PART No	NOTES
		REPLACEMENT DATA	
L1	VHF Ant Coils	1V738869	Channels 2-13, complete wafer assy includes C4, C5, C8
L2	Fil Choke	24K73019E	
L3	Neutralizing Coil	24A738397	
L4	VHF RF Coils	1V738856	Channels 2-13, Complete wafer assy includes C12, C13
L7	Osc Choke	24A739380	
L8	Conv. Plate Trans	24B739079	

ITEM No	USE	MOTOROLA PART No	MEISSNER PART No	MERIT PART No	MILLER PART No.	NOTES
		REPLACEMENT DATA				
L9	47 25MC Trap & Bandwidth Coil	24B737849				
L10	41 4MC Trap	24K737851				
L11	1st Video IF	24B737850	17-4523			
L12	Fil Choke	24K730191	19-1001		6804	1 3 Microhenries
L13	Fil Choke	24K730191	19-1001		6804	1.3 Microhenries
L14	2nd Video IF	24B738267	17-4522	TV-130	6249	
L15	Fil Choke	24K730191	19-1001		6804	1.3 Microhenries
L16	3rd Video IF	24B738268	17-4522	TV-130	6249	
L17	RF Choke	24A737839			4612	1.34 Microhenries
L18	Resonant Choke	24K737733	19-1005		4612	10 Microhenries
L19	Shunt Peaking Coil	24C738006	19-3180	TV-184	6180	180 Microhenries
L20	Series Peaking Coil	24K740518	19-3350 *	TV-186 *	6181 *	340 Microhenries, wound on 5600Ω resistor
L21	4 5MC Trap	24K737290	20-1004			Note 1
L22	Series Peaking Coil	24K740518	19-3350 *	TV-186 *	6181 *	340 Microhenries, wound on 5600Ω resistor
L23	Shunt Peaking Coil	24K740127	19-3300		6183	330 Microhenries
L24	Shunt Peaking Coil	24K740618			6184 ▲	680 Microhenries, wound on 2700Ω resistor
L25	RF Choke	24K737733	19-1005		4613	10 Microhenries
L26	Ist. Sound IF	24K739030				Tapped @ 1.4Ω
L27	2nd. Sound IF	24K739031			1470	
L28	Ratio Det.	24B739673	17-3497	TV-185	6306	Tertiary winding -, RO
L29	RF Choke	24A733235	19-1005		4613	10 Microhenries
L30	RF Choke	24A733235	19-1005		4613	10 Microhenries

* Parallel with 5600Ω resistor.
▲ Parallel with 2700Ω resistor
Note 1: Alternate part #24B738943 used in some versions.
Note 2. Alternate part #24K735697 used in some versions.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No	Rem PART No	Thordarson PART No	NOTES
			REPLACEMENT DATA							
L31	37Ω		1V739709 ①	19-1576	TV-163	6210			RS-5	

① Alternate part #1V741946 used in some versions.

FILTER CHOKE

ITEM No	TOTAL D.C. CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ~\	MOTOROLA PART No	Heiffelcron PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
	RATINGS			REPLACEMENT DATA					
L32	345A	47Ω	1.54 HY.	25K738763	C5037 ①	C-3296 ①	C-3236 ①	38C64	C-17X ①

① Drill one new mounting hole.

FUSES

ITEM No	TYPE	RATING	MOTOROLA PART No		LITTELFUSE PART No.		BUSS PART No	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
			REPLACEMENT DATA					
M1	1" Pc. #26 wire ①							
M2	3AG	3/10A 250V	8A737885		313.300 (3AG 3/10A 8/B)	3570H	MDL 3/10	6408
M3	3AG	5A 250V	8A753288 ①	51A743384 ①	312005 (3AG 5A)	3570H	MTH5	6408

① Not used in some versions.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	MOTOROLA PART No.	SYLVANIA PART No.	NOTES
		REPLACEMENT DATA		
M4		48C739200	1N90	Video Detector (Clip in)

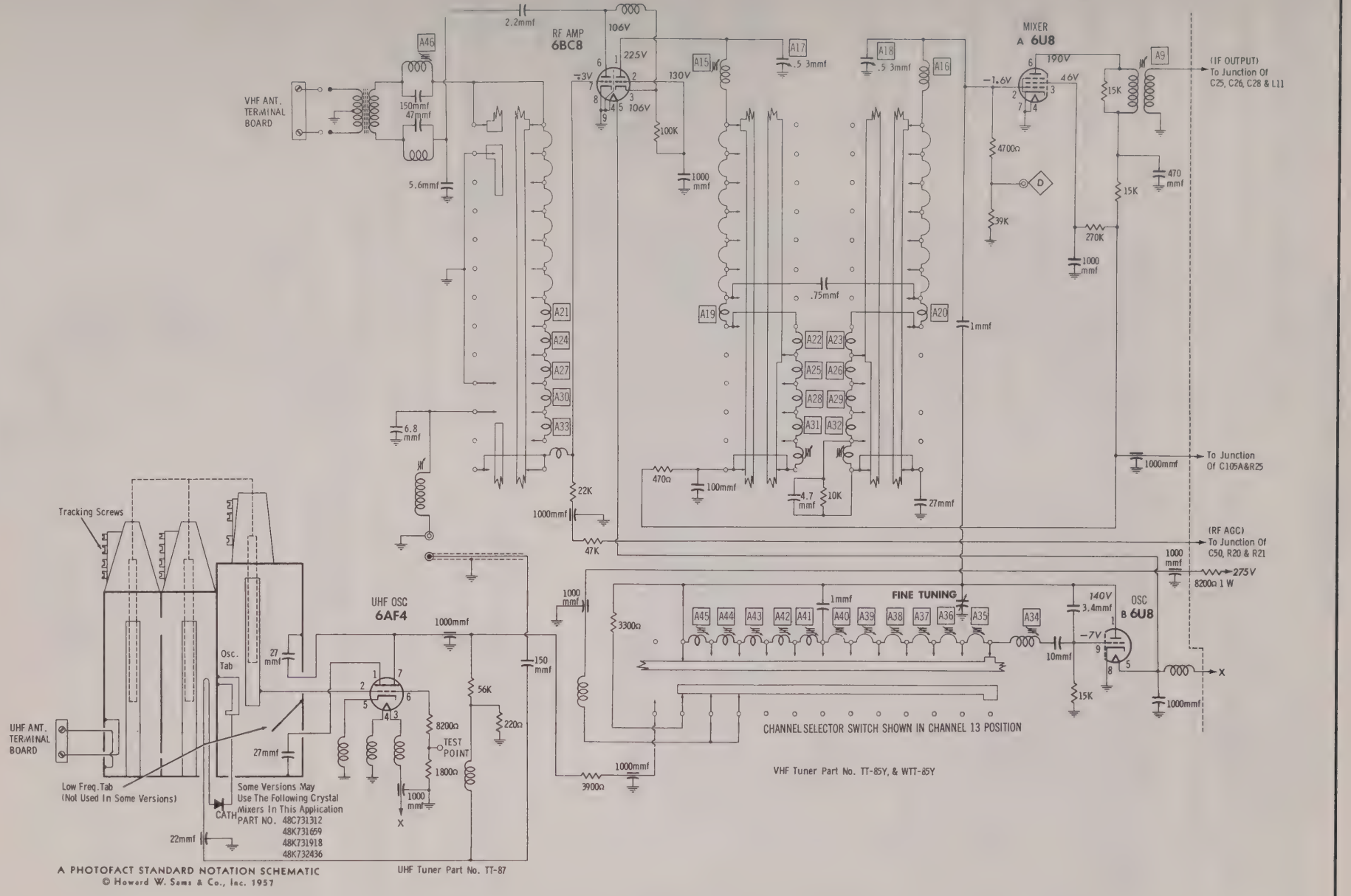
MISCELLANEOUS

ITEM No	PART NAME	MOTOROLA PART No.	NOTES
		REPLACEMENT DATA	
M1	Tuner	TT-35	VHF, 13 position, Used in Ch. TS-539, VTS-539, WTS-539
	Tuner	TT-35Y	VHF, 13 position, Used in Ch. TS-539Y, VTS-539Y, WTS-539Y
	Tuner	WTT-35	VHF, Used in Ch. TTS-539
	Tuner	WTT-35Y	VHF, Used in Ch. TTS-539Y
	Tuner	TT-37	UHF, Used in Ch. TS-539Y, TTS-539Y, VTS-539Y, WTS-539Y
M2	Crystal Detector Assy.	24C739298	Complete with 4th. Video IF, caps. and M4
M7	Switch	40B738138	On-off, push type
M8	Switch	40B739067	Automatic station selector, push type
M9	Switch	40B739511	Cam
M10	Switch	1S739338	Automatic Station Selector, Relay type
M11	Centering Device	48A72145	Includes yoke cover
M12	Ion Trap	59C73779	
M13	Magnet	48B737365	Anti-pin cushion(2 used) Alternate part #48B737087

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS (cont)

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M14	Motor	59D739334	Tuner motor assembly, Includes M10
	Safety Glass	61D738459	Models A21C5B, MC, YA21C5B, MC, A21F6W, Y, A21K56B, M, Y21K56B, M, A21K57B, M, MCH, YA21K57B, M, MCH, A21K58B, M, YA21K58B, M, A21K60B, MC, YA21K60B, MC, A21K61MCH, W, YA21K61MCH, W, A21K62M, Y, A21K63CW, Y, A21T36B, M, YA21T36B, M
	Safety Glass	61K736858	Tinted, Models A21K54B, M, YA21K54B, M, A21T35B, M, Y21T35B, M, A21T33BG, CH, MG, YA21T33BG, CH, MG
	Safety Glass	61K738459	Models A21K59M, MCH, YA21K59M, MCH
	Safety Glass	61K738649	Models A24K14B, M, YA24K14B, M, A24K15M, MCH, YA24K15M, MCH, A24T6B, M, YA24T6B, M
	Bezel	13K739182	Models A21C5B, MC, YA21C58, MC, A21F6W, Y, A21K60B, MC, YA21K60B, MC, A21K61MCH, W, YA21K61MCH, W, A21K62M, Y, A21K63CW, Y
	Bezel	13K738563	Models A21K54B, M, YA21K54B, M, A21T33BG, CH, MG, YA21T33BG, CH, MG
	Bezel	13F738513	Models A21K56B, M, YA21K56B, M, A21K57B, M, MCH, YA21K57B, M, MCH, A21K58B, M, YA21K58B, M, A21K59M, MCH, YA21K59M, MCH, A21T36B, M, YA21T36B, M
	Bezel	13F738560	Models A24K14B, M, YA24K14B, M, A24T6B, M, YA24T6B, M
	Bezel	13K739912	Models A24K15M, MCH, YA24K15M, MCH
	Bezel	13K738563	Models A21T35B, M, YA21T35B, M
	Knob	38B739014	On-off pushbutton, front, Models A21C5, B, MC, YA21C5B, M, A21F6W, Y, A21K57B, M, MCH, A21K56B, M, YA21K56B, M, YA21K57B, M, MCH, A21K58B, M, YA21K58B, M, A21K59M, MCH, YA21K59M, MCH, A21K60B, MC, YA21K60B, MC, A21K61MCH, W, YA21K61MCH, W, A21K62M, Y, A21K63CW, Y, A24K14B, M, YA24K14B, M, A24K15M, MCH, YA24K15M, MCH, A21T36B, M, YA21T36B, M, A24T6B, M, YA24T6B, M
	Knob	38K739015	Channel selector pushbutton, front, Models A21C5B, MC, YA21C5B, MC, A21F6W, Y, A21K56B, M, YA21K56B, M, A21K57B, M, MCH, YA21K57B, M, MCH, A21K58B, M, YA21K58B, M, A21K59M, MCH, YA21K59M, MCH, A21K60B, MC, YA21K60B, MC, A21K61MCH, W, YA21K61MCH, W, A21K62M, Y, A21K63CW, Y, A24K14B, M, YA24K14B, M, A24K15M, MCH, A21T36B, M, YA21T36B, M, A24T6B, M, YA24T6B, M, YA24K15M, MCH
	Knob	38K739018	On-off, Channel Selector Pushbuttons, Rear, Models A21C5B, MC, YA21C5B, MC, A21F6W, Y, A21K56B, M, YA21K56B, M, A21K57B, M, MCH, YA21K57B, M, MCH, A21K58B, M, YA21K58B, M, A21K59M, MCH, YA21K59M, MCH, A21K60B, MC, YA21K60B, MC, A21K61MCH, W, YA21K61MCH, W, A21K62M, Y, A21K63CW, Y, A24K15M, MCH, YA24K15M, MCH, A21T36B, M, YA21T36B, M
	Knob	38B738849	On-off, Channel Selector, Front, Pushbutton, Models A21K54B, M, YA21K54B, M, A21T33BG, CH, MG, A21T35B, M, YA21T35B, M
	Knob	38K738850	On-off, Channel Selector, Rear, Pushbutton, Models A21K54B, M, YA21K54B, M, A21T33BG, CH, MG, YA21T33BG, CH, MG, A21T35B, M, YA21T35B, M
	Knob	38K739017	On-off, Channel Selector, Rear, Pushbutton, Models A24K14B, M, YA24K14B, M, A24K15M, MCH, YA24K15M, MCH, A24T6B, M, YA24T6B, M
	Knob	36K738945	VHF Channel Selector, Models A21C5B, MC, A21F6W, A21K60B, MC, A21K61MCH, W, A21K62M, A21K63W, A24K15M, MCH
	Knob	36C738944	VHF Channel Selector, Models YA21F6W, YA21K60B, MC, YA21K61MCH, W, YA21K62M, YA21K63W, YA24K15M, MCH, YA21C5B, MC
	Knob	36K738682	VHF Channel Selector, Models A21K54B, M, A21T35B, M
	Knob	36C738681	VHF Channel Selector, Models YA21K54B, M, YA21T33BG, CH, MG, YA21T35B, M
	Knob	36K741109	VHF Channel Selector, Models A21K56B, M, A21K57B, M, MCH, A21T36B, M
	Knob	36C738935	VHF Channel Selector, Models YA21K56B, M, YA21K578, M, MCH, Y21K58B, M, YA21K59M, MCH, YA24K14B, M, YA21T36B, M, YA24T6B, M
	Knob	36K738936	VHF Channel Selector, Models A21K58B, M, A21K59M, MCH, A24K14B, M, A24T6B, M,
	Knob	36K741110	VHF Channel Selector, Models A21T33BG, CH, MG
	Knob	36B738701	Contrast, Models A21C5B, MC, YA21C5B, MC, A21F6W, Y, A21K56B, M, YA21K56B, M, A21K57B, M, MCH, YA21K57B, M, MCH, A21K58B, M, YA21K58B, M, A21K59M, MCH, YA21K59M, MCH, A21K60B, MC, YA21K60B, MC, A21K61MCH, W, YA21K61MCH, W, A21K62M, Y, A21K63CW, Y, A24K14B, M, YA24K14B, M, A24K15M, MCH, YA24K15M, MCH, A21T36B, M, YA21T36B, M, A24T6B, M, YA24T6B, M
	Knob	36B738679	Contrast, Models A21K54B, M, YA21K54B, M, A21T33BG, CH, MG, YA21T33BG, CH, MG, A21T35B, M, YA21T35B, M
	Knob	36C738713	Fine tuning, Models A21C5B, MC, YA21C5B, MC, A21F6W, Y, A21K56B, M, YA21K56B, M, A21K57B, M, MCH, YA21K57B, M, MCH, A21K58B, M, YA21K58B, M, A21K59M, MCH, YA21K59M, MCH, A21K60B, MC, YA21K60B, MC, A21K61MCH, W, YA21K61MCH, W, A21K62M, Y, A21K63CW, Y, A24K14B, M, YA24K14B, M, A24K15M, MCH, YA24K15M, MCH, A21T36B, M, YA21T36B, M, A24T6B, M, YA24T6B, M
	Knob	36C738680	Fine Tuning, Models A21K54B, M, YA21K54B, M, A21T33BG, CH, MG, YA21T33BG, CH, MG, A21T35B, M, YA21T35B, M
	Knob	36B738714	Horiz. Hold, Vert. Hold, Brightness and tone, Models A21C5B, MC, YA21C5B, MC, A21F6W, Y, A21K56B, M, YA21K56B, M, A21K57B, M, MCH, YA21K57B, M, MCH, A21K58B, M, YA21K58B, M, A21K59M, MCH, YA21K59M, MCH, A21K60B, MC YA21K60B, MC, A21K61MCH, W, YA21K61MCH, W, A21K62M, Y, A21K63CW, Y, A24K14B, M, YA24K14B, M, A24K15M, MCH, YA24K15M, MCH, A21T33BG, CH, MG, Y, A21T36B, M, YA21T36B, M, A24T6B, M, YA24T6B, M
	Knob	36B738676	Horiz. Hold, Vert. Hold, Brightness, Models A21K54B, M, YA21K54B, M, A21T33BG, CH, MG, YA21T33BG, CH, MG
	Knob	36B738678	Volume - All Models
	Knob	36K636603	Phono-Bass, Models A21F6W, Y
	Knob	36K636604	Phono-Treble, Models A21F6W, Y
	Knob	36K636602	Phono-Volume, Models A21F6W, Y



ALTERNATE UHF-VHF TUNER SCHEMATIC

MOTOROLA CHASSIS TS-539, Y, TTS-539, Y, VTS-539, Y, WTS-539, Y & Phono Amp. HS-495

DISASSEMBLY INSTRUCTIONS

CABINETS WITH OVAL-SHAPED GLASS

Removing the receiver as a unit

1. Remove the hex head screw in back cover (located between the serial number and the power cord inlet). Remove screws on masonite cabinets - or - pry back cover off using a screwdriver on metal cabinets.

2. Disconnect the speaker plug. Speaker is of the PM type and not required for receiver operation.

3. Remove the fibre L-shaped tie-down strip in the upper portion of the chassis. (The strip bolts to chassis and edge of cabinet.)

4. Working at front of cabinet: remove the decorative strip located at the top edge of the safety glass.

5. Hold safety glass and remove glass retainer screw and remove the retainer. Remove safety glass and place in a safe location.

6. Remove the two Phillips head screws exposed by the top safety glass retainer removal.

7. Place cabinet into a suitable position so that bolts underneath cabinet may be reached. Remove bolts holding bottom pan to the cabinet only. Do not remove the bolts holding the bottom pan to the chassis. (Correct bolts may be seen from rear of receiver.

8. Remove entire front of cabinet with bottom pan, chassis and picture tube attached.

9. CAUTION: Bending or warping bottom pan or cabinet front will make replacement of unit difficult .

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Removal of chassis only (oval-glass cabinets)

1. Remove back of cabinet and notice if rear opening (height) of cabinet will permit chassis to be removed from the rear. If so, disconnect the speaker plug, yoke plug, high voltage and the picture tube socket.

2. Remove the channel selector and fine tuning knobs. Remove the escutcheon plate by removing the two Phillips head screws. Remove the Phillips head screw revealed by removal of the escutcheon. Remove remaining control knobs.

3. Working from rear of receiver: remove the fibre L-shaped tie-down strip located in the upper portion of the chassis. (This strip bolts to chassis and edge of cabinet.)

4. Remove the metal brace on left-hand (rear) of cabinet. This brace holds chassis to bottom pan. Leave capacitor and resistor unit attached to the brace for remainder of hook-up.

5. Place cabinet into required position and remove bolts holding chassis to bottom of cabinet (metal pan) on underside of receiver.

6. Remove chassis.

7. Remove deflection yoke for shop use.

CABINETS WITH RECTANGULARLY-SHAPED GLASS

Removing the receiver as a unit

1. Remove bolt in back cover (located between the serial number and the power cord inlet). Pry back cover off carefully, using a screwdriver. On wood or masonite cabinets, remove all screws in back cover.

2. Disconnect the speaker plug (speaker is of the PM type and not required for receiver operation).

3. Remove the fibre L-shaped tie-down strip located in the upper portion of the chassis. The fibre strip bolts to chassis and edge of cabinet.

4. Working at front of cabinet: remove the control cover by prying outward and then remove all front panel knobs.

5. Remove the four screws in overlay panel, then remove the panel.

6. Remove Phillips head screw at upper right-hand side holding cabinet front to cabinet.

7. Reach in through rear of receiver and remove 10-32 hex nut at extreme right hand side of cabinet...located near the top of the cabinet.

8. Place cabinet in required position and remove the bolts located underneath the cabinet and holding the bottom pan to the cabinet. (Do not remove the bolts holding the chassis to the bottom pan.)

9. Remove entire front of cabinet with bottom pan, chassis and picture tube attached.

10. CAUTION: Bending or warping bottom pan or cabinet front will make replacement of the unit difficult.

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Removal of chassis only (rectangular-glass cabinets)

1. Remove bolt in back cover (located between the serial number and the power cord inlet). Remove screws on masonite cabinet - or - pry back cover off carefully using a screwdriver on metal cabinets.

2. Determine if the height of the cabinet is sufficient to allow removal of the chassis. If it is not, it will be necessary to refer to the preceding procedure for removal of the entire receiver ... then remove the chassis.

3. Disconnect the speaker plug (speaker is of the PM type and is not rquired for receiver operation), yoke plug, high voltage lead and the picture tube socket.

4. Remove the fibre L-shaped tie-down strip located in the upper portion of the chassis. The fibre strip bolts to chassis and edge of cabinet.

5. Remove brace on left hand (rear) of cabinet. This brace holds chassis to the bottom pan. (Leave capacitor and resistor leakage unit attached to the brace.)

6. Working at front of cabinet: remove the control cover by prying outward and then remove all front panel knobs.

7. Remove Phillips head screw (holding chassis to cabinet front).

8. Place receiver in required position and remove bolts (two) from underneath cabinet, holding chassis to bottom pan. (Do not remove bolts holding pan to cabinet.)

9. Remove chassis.

10. Remove deflection yoke for shop use.

REMOVAL OF RECEIVER HAVING A CENTER, TOP DIAL SCALE

Receiver models having a dial scale located at the top center of the cabinet must be removed as a unit (chassis, bezel front and "pan") out the front of the cabinet. The chassis may then be removed from the bezel and "pan".

To remove the receiver as a unit, follow the instructions given in "Removing the receiver as a unit", steps 1 through 10 (CABINETS WITH RECTANGULARLY-SHAPED GLASS). After bezel, chassis and pan are out of the cabinet, proceed to remove chassis from bezel and pan as follows.....

1. Disconnect the speaker plug (speaker is of the PM type and is not required for receiver operation), yoke plug, high voltage lead and the picture tube socket.

2. Remove brace on left hand (rear) of cabinet. This brace holds chassis to the bottom pan. If a resistor and capacitor unit are attached to this brace, pry off of the brace and leave with the pan and bezel ... this will be a reminder to hook it up when the chassis is returned.

3. Remove brace at top of chassis (high voltage cage end) holding chassis to bezel front.

4. Release dial scale drive belt, at center of bezel, from roller guides of the chassis. If belt has sufficient slack, walk belt over edge of dial scale. If belt does not have sufficient slack to be removed over the dial scale ... remove the dial scale by removing the washer from underneath, then lift the dial scale up and out.

5. Working at front of cabinet: remove the control cover by prying outward and then remove all front panel knobs.

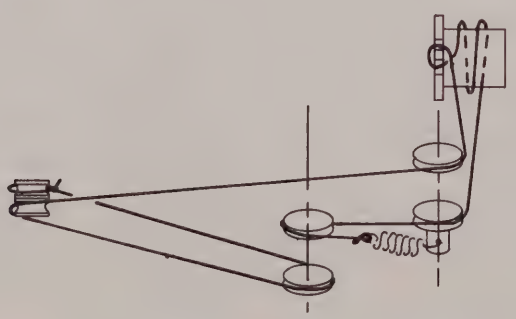
6. Remove Phillips head screw (holding chassis to cabinet front "bezel").

7. Place receiver in required position and remove bolts (two) from underneath cabinet, holding chassis to bottom of pan.

8. Remove chassis.

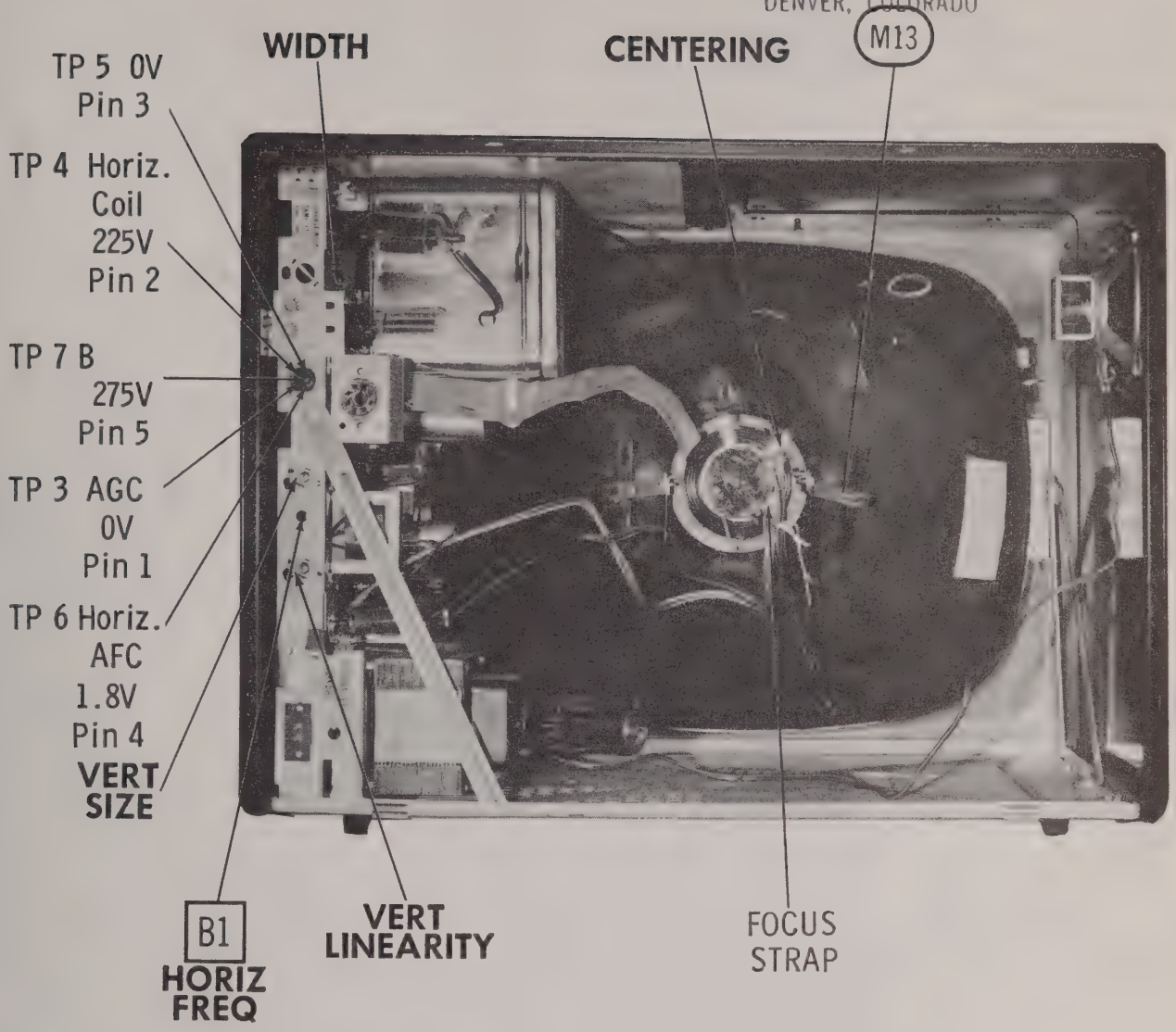
9. Remove deflection yoke for shop use.

10. To replace chassis, reverse foregoing procedure.



UHF DRIVE CORD STRINGING

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



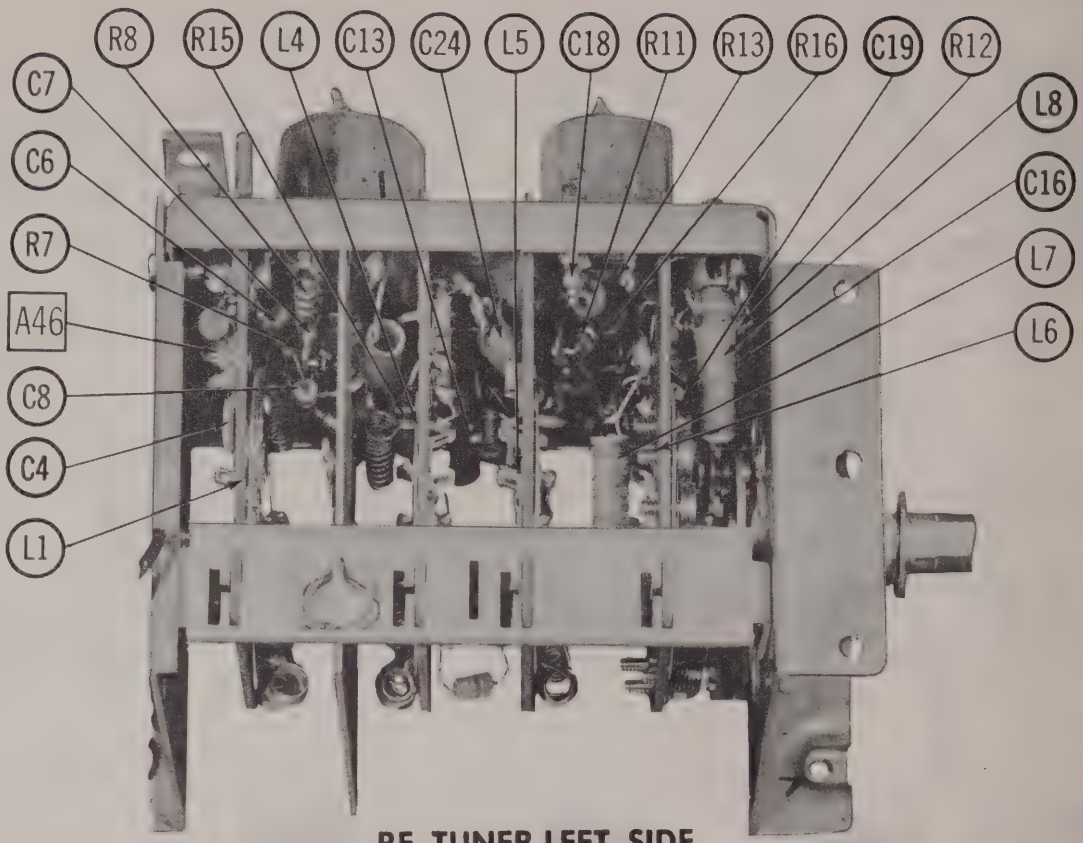
CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

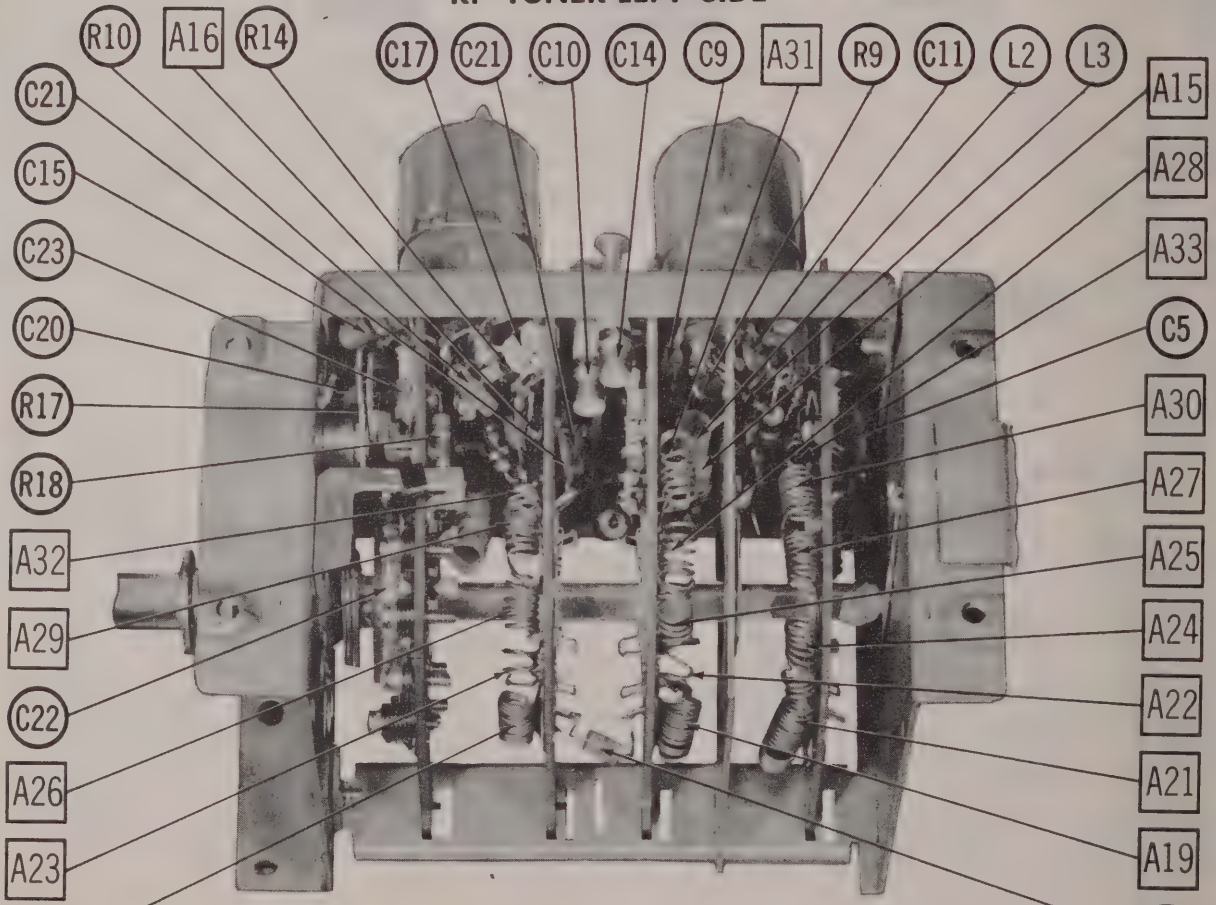
Turn the set on and tune in a TV station, preferably with a test pattern.

Adjust the brightness and contrast controls for a normal picture.

1. Connect a piece of wire from pin 4 of the service test receptacle to chassis, thereby grounding the AFC circuit.
2. Connect a .1MFD 400 volt capacitor from pin 2 to pin 3 of the service test receptacle, thereby shunting the horizontal frequency coil.
3. Adjust the horizontal hold control to the point where the picture remains stationary horizontally.
4. Remove the .1MFD capacitor from the service test receptacle and adjust the horizontal frequency slug (B1) to the point where the picture remains stationary horizontally.
5. Remove the short from pin 4 of the service test receptacle and adjust the horizontal hold control until the picture remains in sync over 30 degrees of its range when switching off channel and back again.
6. Adjust the horizontal size control (located on the rear of the chassis) for a picture SLIGHTLY wider than necessary to fill the picture mask horizontally.



RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MOTOROLA MODELS
67C1, 67C2 (Ch. HS-529)

MOTOROLA MODELS
67C1, 67C2 (Ch. HS-529)

TRADE NAME	Motorola Models 67C1, 67C2 (Ch. HS-529)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC Operated AM Receiver With Electric Clock
TUBES (Six)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12CR6 Det.-AVC-AF Amp. 35C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .31 Amp. @ 117 Volts AC (27 Watts Without Clock)
TUNING RANGE—BROADCAST	530KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in the same relative position to chassis as when the receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal.	"	A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	Tune to 600KC signal	"	A8	"

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1957 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under international Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MOTOROLA
MODEL 67C1 (Ch. HS-529)

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	

ITEM No.	USE	TYPE	NOTES
V4	Det. -AVC-AF Amplifier	12CR6	
V5	Output	35C5	
V6	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	63K634275	PRS150V40-3020	BBRT43215	TCT3285	TDLT-3	FMT-312	TVA-3448
B	30	150							
C	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200	8R121005	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C3	10000		21R482726	BPD-01	DD-103	BYA6S1	GP-10000	DC511	5HK-S1	
C4	2000		21R121106	BPD-002	DD-202	BYA10D2	GP-2000	DC522	5HK-D2	
C5	100		21R400537	N750-S1100	TCN-100	C10T1U	TC7-100	NT-531	5TCU-T1	
C6	.05	400	8R121567	BPD-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C7	.001	600	8R122103	BPD-001	DD-102	CUB6D1	GP-1000	GEM-621	6TM-D1	
C8	.004	600	8R121000	BPD-004	D6-402	CUB6D4	GP-4000	GEM-624	6TM-D4	
C9	10000		21R482726	BPD-01	DD-103	BYA6S1	GP-10000	DC511	5HK-S1	
C10	10000		21R482726	BPD-01	DD-103	BYA6S1	GP-10000	DC511	5HK-S1	
C11	.047	400	8K490232	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C12	.1	600	8R121869	P688N-1	DF-104	CUB6S1		GEM-601	6TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	1/2	18K635626	F1-51			UF16L	Tone
B	500K			R2-46			UR55-T254	Volume, Tap at 250K

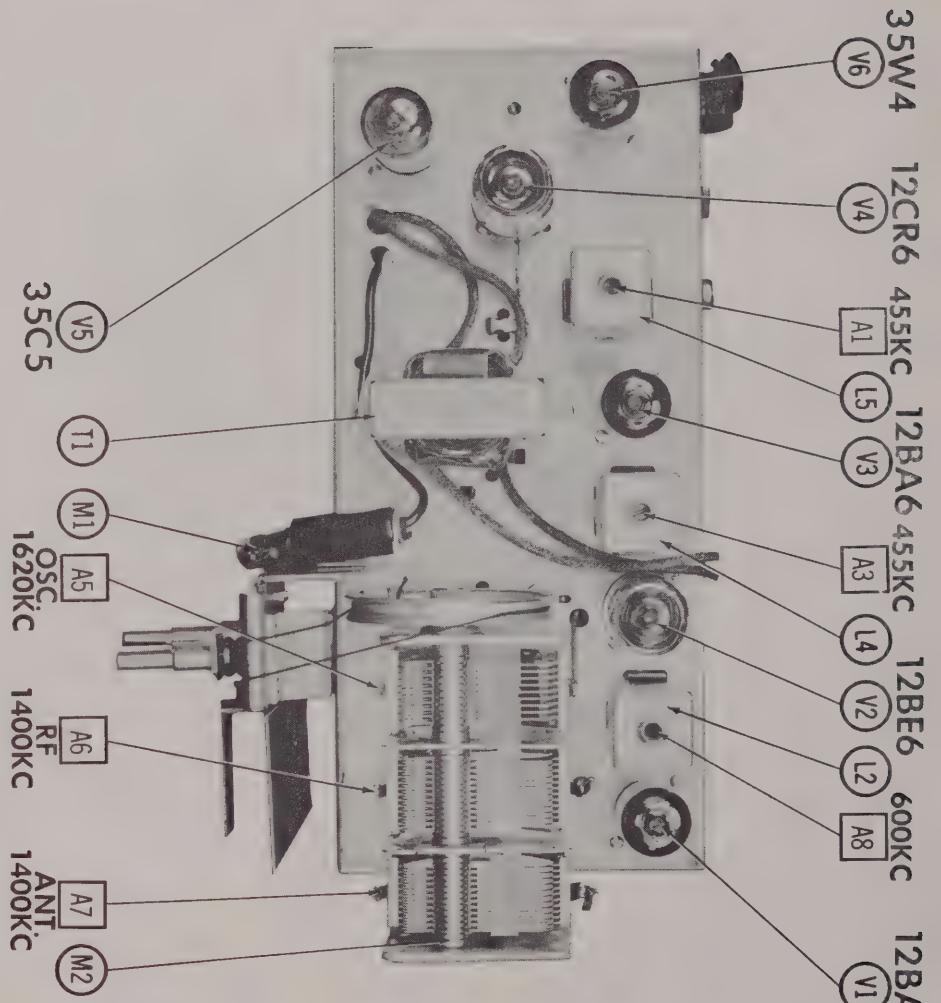
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	68Ω		6R2039	BTS-68	
R3	22K		6R6028	BTS-22K	
R4	100K		6R6075	BTS-100K	
R5	100Ω		6R6326	BTS-100	
R6	2.2Meg		6R3927	BTS-2.2Meg	
R7	47K		6R6056	BTS-47K	
R8	39K		6R6487	BTS-39K	
R9	47K		6R6048	BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R10	2.2Meg		6R3927	BTS-2.2Meg	
R11	100K		6R6075	BTS-100K	
R12	470K		6R6032	BTS-470K	
R13	470K		6R6032	BTS-470K	
R14	150Ω		6R6373	BTS-150	
R15	680Ω	1	6R118211	BTA-680	
R16	220Ω	1	6R6173	BTA-220	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3700Ω	3-4Ω	25C634231	Z1001	A-2903	A-3877	22S45	S-1X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	50C634230	5A07	

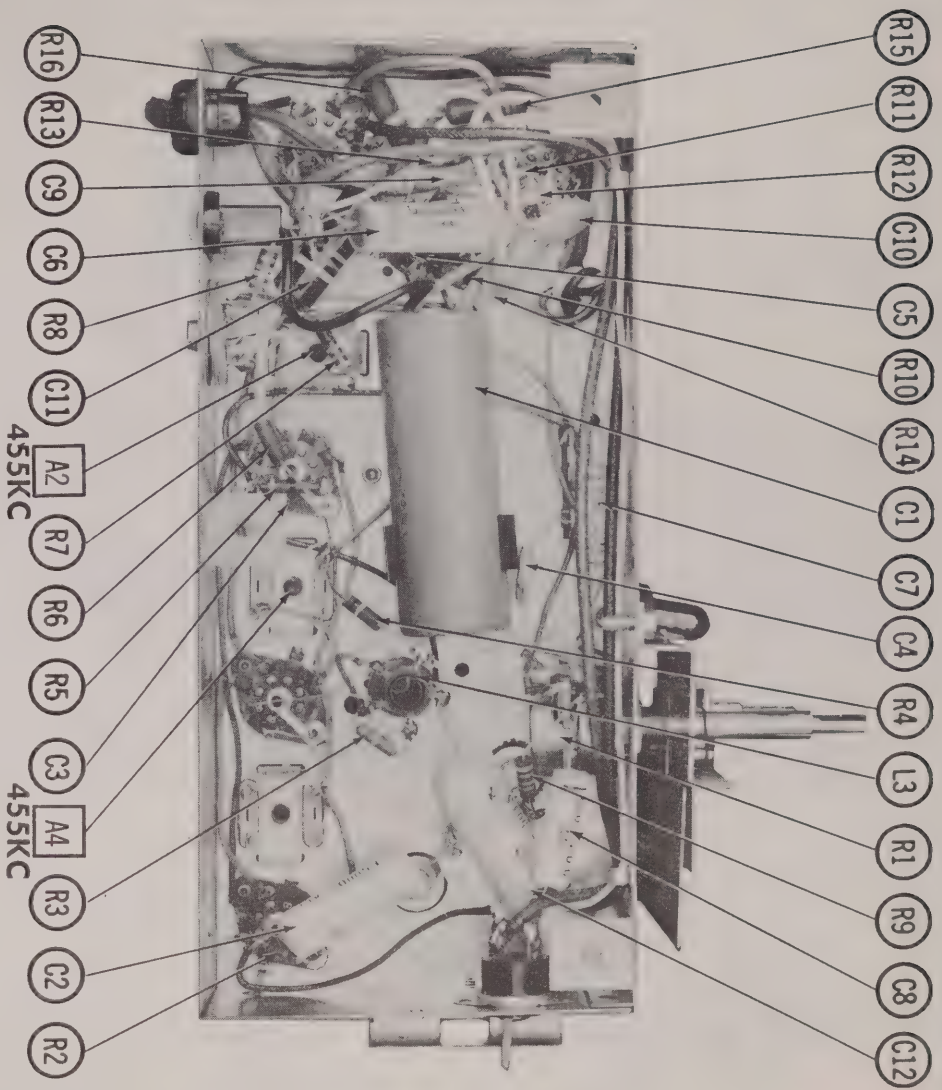
COILS (RF-IF)

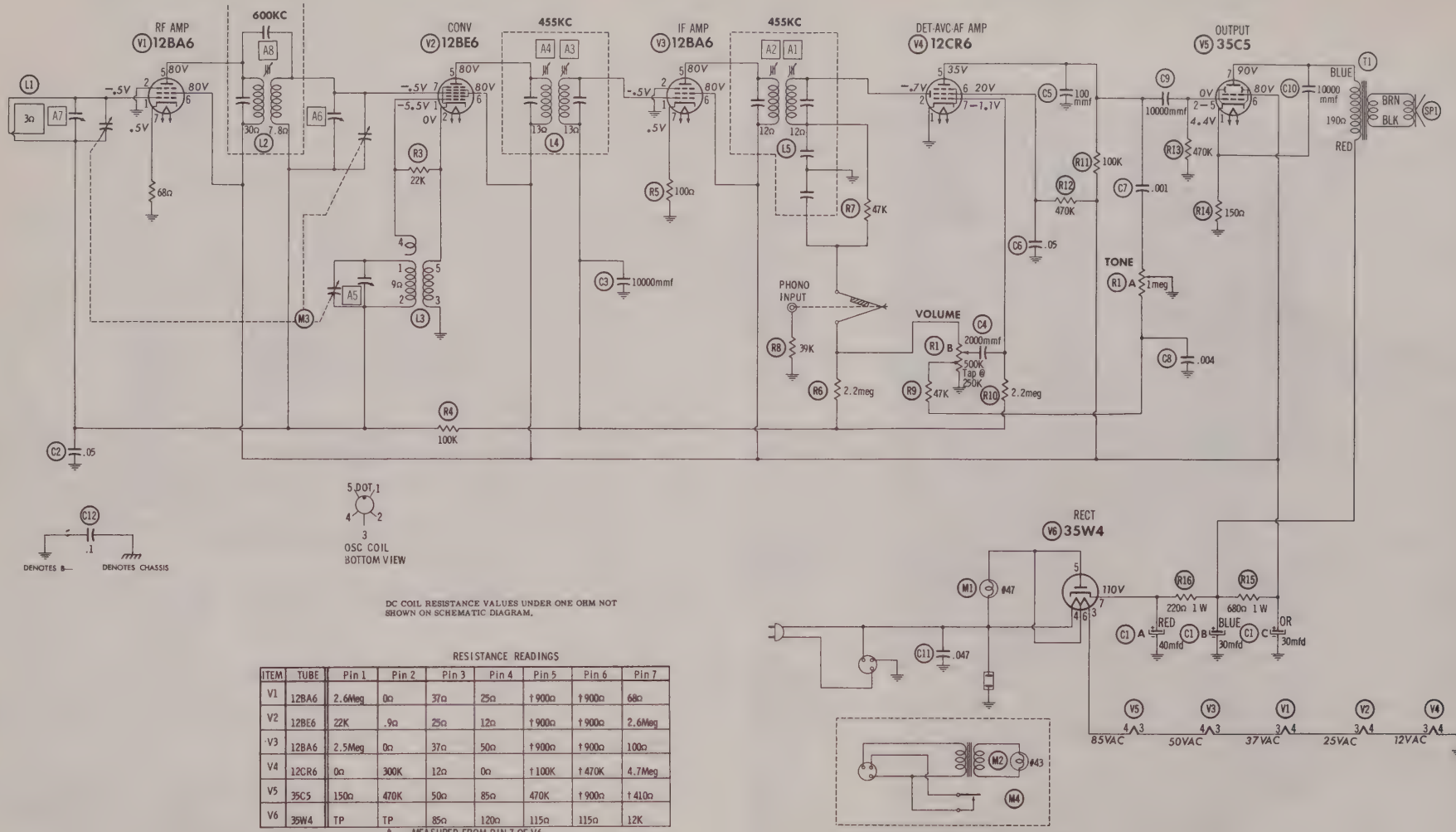
ITEM No.	USE	REPLACEMENT DATA				NOTES
		MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Antenna	1V635838				Includes Cabinet Back
L2	RF Coil	24C634251	14-1411			
L3	Osc. Coil	24B634118			69-OSC	
L4	Input IF	24K634507	16-6758	BC-352	12-C1	
L5	Output IF	24K634508	16-6770	BC-355	12-C2	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Pilot Light	65X11854	Dial, #47
M2	Pilot Light	65T634268	Clock, #43
M3	Tuning Cap.	19C634243	3 Gang (25-385 MMF, 28-420MMF, 27-145MMF)
M4	Clock Assy.	72D634125	
	Crystal	61D634229	Clock & Dial Scale
	Pointer	1K634302	Dial
	Knob	36K634306	Ivory, Clock
	Knob	36K634319	Tone
	Knob	36C634307	On-Off-Volume, Tuning, Model 67C1
	Knob	36K634308	On-Off-Volume, Tuning, Model 67C2
	Cabinet	16K635650	Model 67C2
	Cabinet	16K635649	Model 67C1

CHASSIS—BOTTOM VIEW





DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	2.6Meg	0Ω	37Ω	25Ω	†900Ω	†900Ω	68Ω
V2	12BE6	22K	.9Ω	25Ω	12Ω	†900Ω	†900Ω	2.6Meg
V3	12BA6	2.5Meg	0Ω	37Ω	50Ω	†900Ω	†900Ω	100Ω
V4	12CR6	0Ω	300K	12Ω	0Ω	†100K	†470K	4.7Meg
V5	35C5	150Ω	470K	50Ω	85Ω	470K	†900Ω	†410Ω
V6	35W4	TP	TP	85Ω	120Ω	115Ω	115Ω	12K

† MEASURED FROM PIN 7 OF V6.
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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RETMA MEMBER

SILVERTONE MODELS 6244X, 7236, C, 7242, C, 7244, C, CA, 7245, C, CA, 7246, C, 7247, C, 7298

SILVERTONE MODELS 6244X, 7236, C, 7242, C, 7244, C, CA, 7245, C, CA, 7246, C, 7247, C, 7298

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

SILVERTONE MODELS 6244X, 7236, C, 7242, C, 7244, C, CA, 7245, C, CA, 7246, C, 7247, C, 7298

TRADE NAME Silvertone

MODEL	AMP. CHASSIS	RECORD CHANGER
6244X	567.39003	567.37009
7236	567.39004	567.40001 (or) 567.40101
7236C	567.33012	567.40001 (or) 567.40101
7242	567.39004	567.40001 (or) 567.40101
7242C	567.33012	567.40001 (or) 567.40101
7244	567.39003	567.41000 (or) 567.41100
7244	567.33011	" "
7244	567.33013	" "
7244C	567.33011	" "
7244CA	567.33013	" "
7245	567.39003	" "
7245	567.33011	" "
7245	567.33013	" "
7245C	567.33011	" "
7245CA	567.33013	" "
7246	567.39003	" "
7246	567.33013	" "
7246C	567.33013	" "
7247	567.39003	" "
7247	567.33013	" "
7247C	567.33013	" "
7298	567.39003	" "

SUPPLIER Sears Roebuck & Co., 925 S. Homan, Chicago, Ill.

TYPE SET AC Operated Phono Amplifier With 4 Speed Record Changer

TUBES (Three) Types 12AV6 AF Amplifier, 50C5 Output, 35W4 Rectifier

POWER SUPPLY 110-120 Volts AC - 60 Cycles RATING . 27 Amp. @ 117 Volts AC (25 Watts Without Motor)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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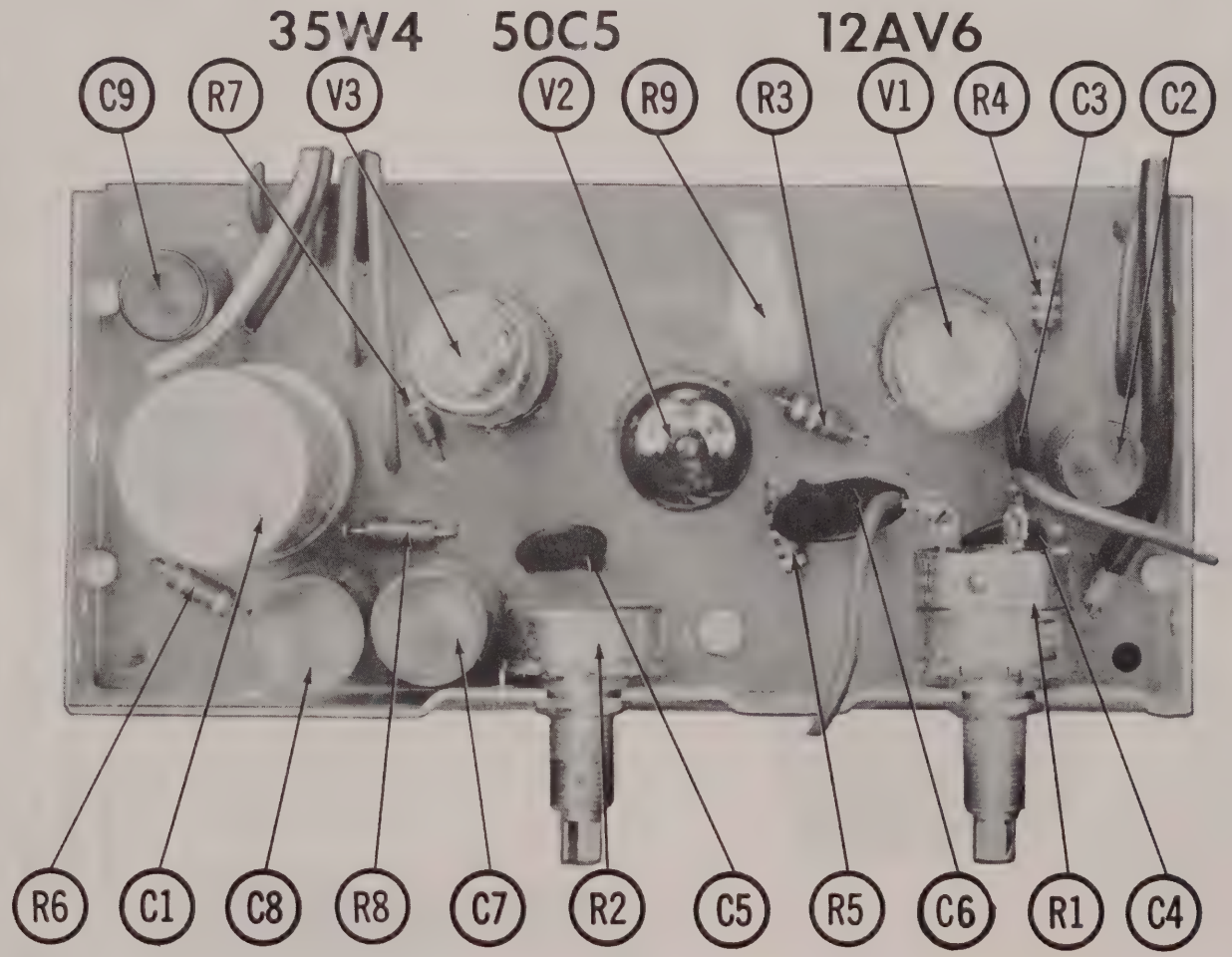


CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amplifier	12AV6	
V2	Output	50C5	

ITEM No.	USE	TYPE	NOTES
V3	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■80	150	770148	AFH3-82	CO610	FP311.1	TMT-67	T-295	TVL-343L 5
B	▲20	150	(Note 1)						
C	20	20							

Note 1: In chassis 567. 33011, 567. 33012, 567. 33013 and 567. 41000, C1C is rated at 25 volts (C1 part no. 770125).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	. 047	200	770122			BC2S47J		ACE6147	2SE-S47	
C3	20000		770092	BPD-02	DD-203	BYA6S2	ED-02		5HK-S2	
C4	100		770112	BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C5	1500		770098	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C6	20000		770092	BPD-02	DD-203	BYA6S2	ED-02		5HK-S2	
C7	. 22	200	770119			BC2P22J		ACE6022	2SE-P22	
C8	. 22	200	770119			BC2P22J		ACE6022	2SE-P22	
C9	. 047	200	770122			BC2S47J		ACE6147	2SE-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	740085					Volume - Note 1
B	Switch							
R2	5Meg	½	740083					Tone - Note 2

Note 1: Ch. 567. 33011, 567. 33013 use part #740060; Ch. 567. 33012 use part #740070; Ch. 567. 39003 use part #740084.
Note 2: Ch. 567. 33011, 567. 33012, 567. 33013 use part #740090.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R3	270K		760052	BTS-270K	
R4	390Ω		760030	BTS-390	
R5	470K		760037	BTS-470K	
R6	1500Ω		760003	BTS-1500	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R7	4700Ω		760017	BTS-4700	
R8	150Ω		760084	BTS-150	
R9	160Ω	5	760316		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.1	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2550Ω	1. 65Ω	700099 ① ②						① Used in ch. 567. 33013, 567. 39003, 567. 39004, 567. 33012 (See speaker note 9) ② Part no. 700081 used in ch. 567. 33011.
	RESISTANCE								
	PRI.	SEC. 2							
	240Ω	7. 7Ω							
	Turns Ratio								
	3. 8 : 1 (sec. 2)								

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	012939①②⑪	5A07 ⑪	
	6"	PM	3-4Ω	011856③ ⑪		
	6"	PM	3-4Ω	013140④⑤ ⑪		
	4"	PM	3-4Ω	011870⑥ ⑪		
	8"	PM	3-4Ω	012148⑦ ⑪		
SP2	5"	PM	3-4Ω	011848⑧ ⑪	5A07 ⑪	
	5 1/4"	PM	3-4Ω	012852⑨ ⑩ ⑪		

① Alternate part #011848.
② Used in ch. 567. 39004 (Model 7242);Ch. 567. 33012 (Model 7242C).
③ Used in Ch. 567. 33013(Models 7244CA, 7245CA, 7244, 7245);Ch. 567. 39003 (Models 6244X, 7244, 7245);Ch. 567. 33011 (Models 7244, 7245, 7244C, 7245C).
④ Used in Ch. 567. 39003 (Model 7298).
⑤ Some versions may use 8" speaker, part #012148 in this application.
⑥ Used in Ch. 567. 39004 (Model 7236); Ch. 567. 33012 (Model 7236C).
⑦ Used in Ch. 567. 33013 (Models 7246CA, 7247C, 7246, 7247); Ch. 567. 39003 (Models 7246, 7247).
⑧ Used in Ch. 567. 39004 (Model 7242); Ch. 567. 33012 (Model 7236C).
⑨ Includes output trans. & plug. Used in Ch. 567. 33013 (All Models); Ch. 567. 39003 (All Models); Ch. 567. 39004 (Model 7236); Ch. 567. 33012 (Model 7236C).
⑩ Part #011857 (less output trans. & plug) used in Ch. 567. 33013 (All Models); Ch. 567. 39003 (All Models);Ch. 567. 33011 (All Models); Ch. 567. 39004 (Model 7236); Ch. 567. 33012 (Model 7236C).
⑪ Connect in parallel & phase.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	SILVERTONE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M1	720091	55-T	GD-J	56	PT-2	

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

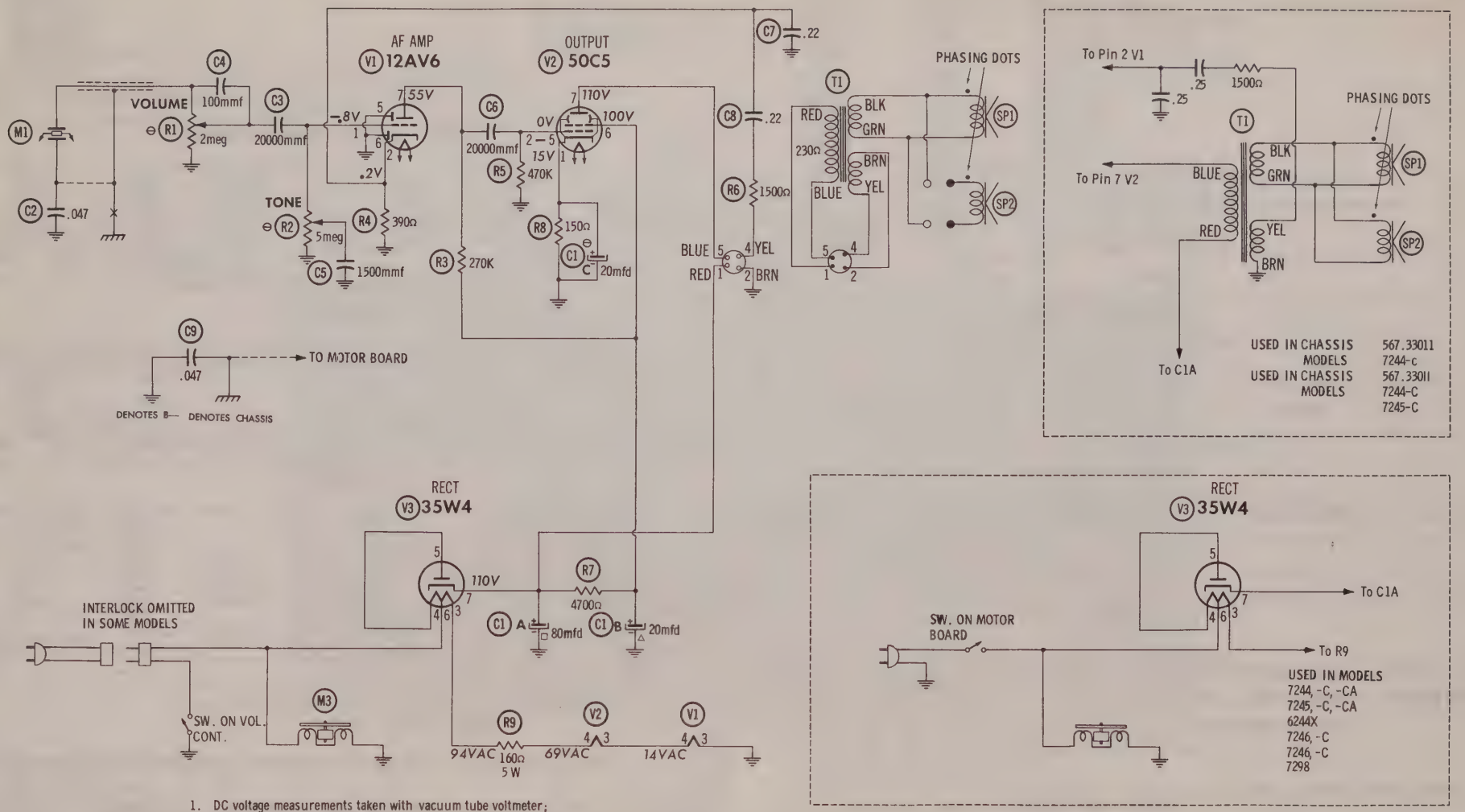
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	SILVERTONE PART No.	JENSEN PART No.	WALCO PART No.	
M2	720055	†S-66 or †♦S-66SD or ♦S-66D	†W-75TPS or †♦W-75DS or ♦W-75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	Phono Motor	012890	Used in Ch. 567. 40001, 567. 40101.
	Phono Motor	012982	Used in Ch. 567. 41000.
	Phono Motor	012979	Used in Ch. 567. 41100.
	Knob	310394	Tone or Volume, Models 7236, 7236C, 7242, 7242C, 7244, 7244C, 7244CA, 7245, 7245C, 7245CA.
	Knob	310402	Tone or Volume, Models 7246, 7246C, 7247, 7247C, 7298.
	Knob	310235	Tone or Volume, Model 6244X.
	Cabinet	440167	Model 6244X.
	Cabinet	440308	Model 7236.
	Cabinet	440405	Model 7236C.
	Cabinet	440318	Model 7242.
	Cabinet	440407	Model 7242C.
	Cabinet	440323	Model 7244 (Ch. 567. 39003).
	Cabinet	440409	Model 7244, 7244CA (Ch. 567. 33013).
	Cabinet	440361	Model 7244 (Ch. 567. 33011), 7244C.
	Cabinet	440363	Model 7245, 7245C (Ch. 567. 33011).
	Cabinet	440310	Model 7245 (Ch. 567. 39003).
	Cabinet	440410	Model 7245, 7245CA (Ch. 567. 33013).
	Cabinet	440344	Model 7246, 7246C.
	Cabinet	440345	Model 7247, 7247C.



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12AV6	5Meg	390Ω	0Ω	14Ω	0Ω	0Ω	†275K
V2	50C5	150Ω	470K	14Ω	65Ω	470K	†4700Ω	† 230Ω
V3	35W4	NC	NC	225Ω	260Ω	260Ω	250Ω	20K

† MEASURED FROM PIN 7 OF V3.
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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SONORA MODELS
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SONORA MODEL 560

TRADE NAME	Sonora Models 560, 567, 577, 578
MANUFACTURER	Sonora Radio & Tel. Corp., 325 North Hoyne Ave., Chicago, Illinois
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	105-125 Volts AC-60 Cycle — RATING 150 Watts, 1.45 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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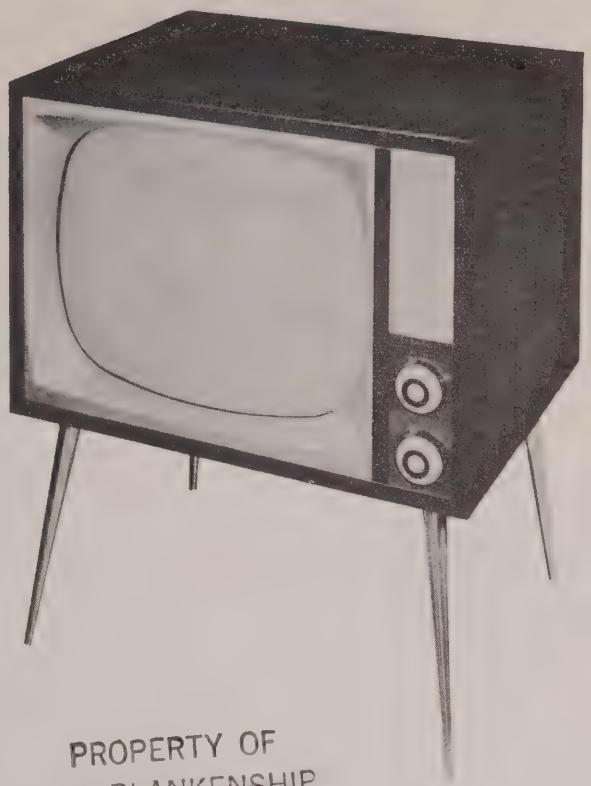

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type knobs from front.
2. Remove 10 metal screws and rear cover.
3. Remove hex nut holding volume-contrast control to bracket.
4. Remove 2 speaker leads, picture tube socket, Ion trap, HV lead, loosen 2 hex nuts holding yoke assembly and remove yoke wing nut.
5. Remove 7 chassis bolts from bottom.
6. Remove chassis, while sliding yoke off picture tube neck.
7. Remove 2 speaker nuts and speaker.

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

Care should be exercised when connecting test equipment or physcially contacting chassis.

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SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube and safety glass cleaning, it is necessary to remove the chassis. (See disassembly instructions).

FOCUS

Adjust the Ion trap for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal frequency coil is used as the horizontal hold control. Adjust the horizontal hold until the picture synchronizes horizontally. For location, see tube placement chart.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the buzz control for MINIMUM buzz and maximum sound. (For location see tube placement chart).

FUSES

A 5.5Ω fusible resistor (R82) is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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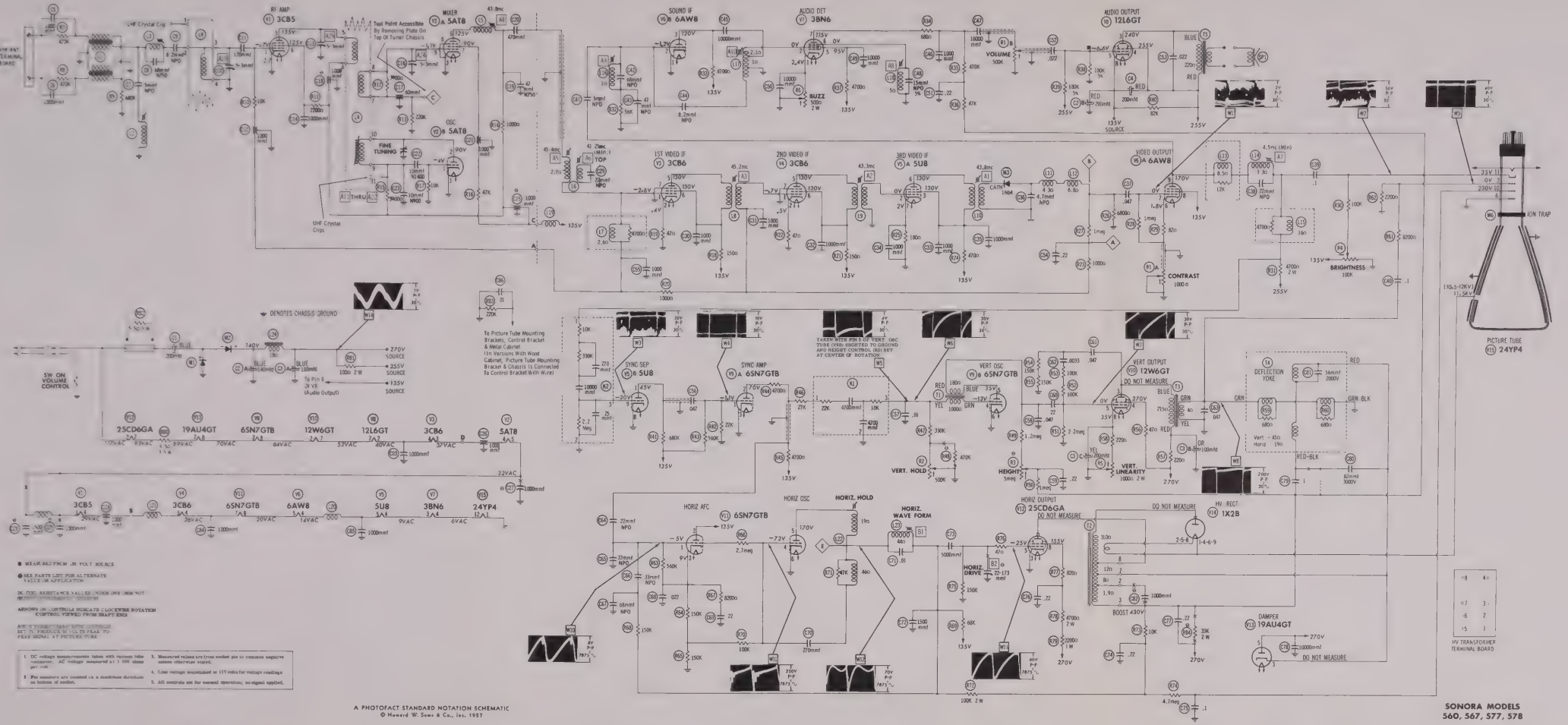

● MEASURED FROM .35 VOLT SOURCE

◉ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC VOLTAGE RESISTANCE VALUES SHOWN ONE DECIMAL NOT SIGNIFICANT

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION
CONTROL VIEWED FROM SHAFT END

ADJUST TRIMMER MARKED ○ CONTROL SET TO PRODUCE 90 VOLTS PEAK TO PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1 000 ohms per volt.
2. Pin numbers are counted ↻ in a counterclockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise noted.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

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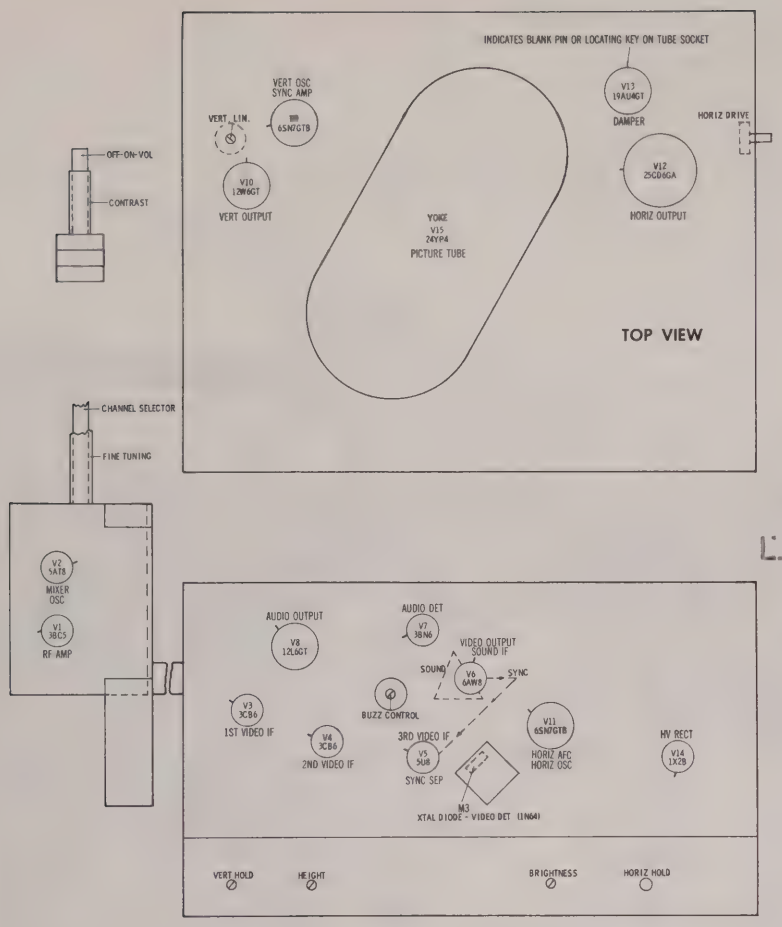
TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

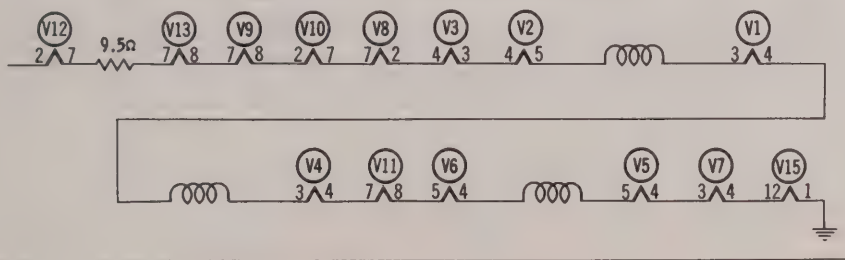
POWER SUPPLY FAILURE
No raster, no sound - Fusible Resistor (R82), Rectifiers (M1, M2), V8

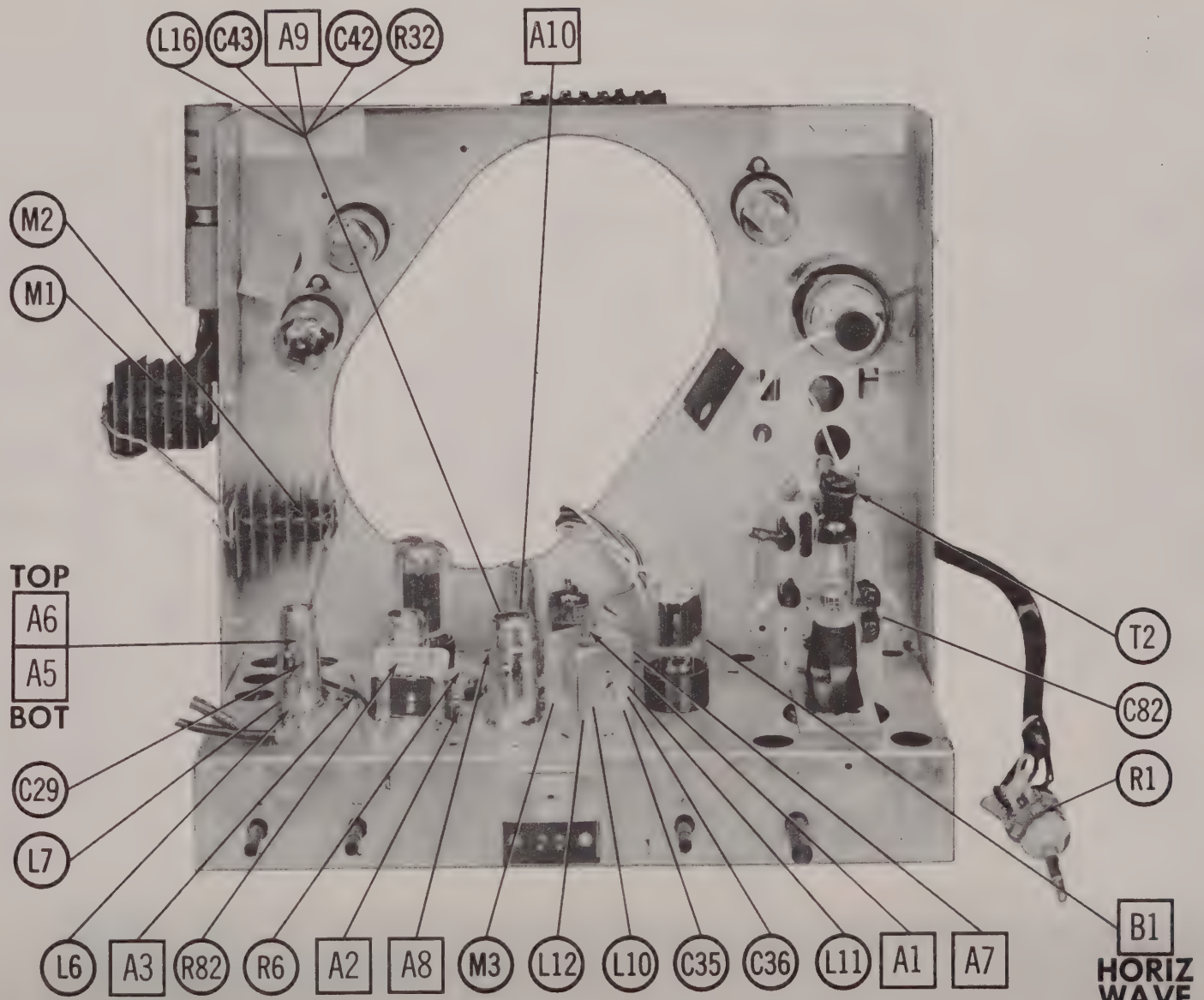
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, Diode (M3), V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V15
Has pic, no sound - V6, V7, V8

SYNC FAILURE
No vert. sync - V5, V9, V8
No horiz. sync - V5, V9, V11, V8
No vert. or horiz. sync - V5, V9, V8

SWEEP FAILURE
No raster, has sound -V11, V12, V13, V14, V15, V8
No vertical deflection - V9, V10
Poor vert. linearity or foldover - V9, V10
Poor horiz. linearity or foldover - V11, V12, V13, V8
Narrow picture - V11, V12, V13, V8, M1, M2
Vert. off freq. - V9
Horiz. off freq. - V11

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative (See circuit below).





CHASSIS TOP VIEW

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VERTICAL CHASSIS - BOTTOM VIEW

SONORA MODELS
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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The high voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point Ⓐ. Positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over mixer-osc. tube, 5U8 (V2). Low side to chassis.	Not Used	43. 8MC	Any non-interfering channel.	USE VTVM DC probe to point Ⓑ. Common to chassis.	A1	Adjust for maximum deflection. Keep generator output set to provide approximately 1 volt on VTVM.
2.	"	"	"	43. 3MC	"	"	A2	"
3.	"	"	"	45. 2MC	"	"	A3	"
4.	"	"	"	43. 8MC	"	"	A4	Preset A5 fully counter clockwise. Adjust A4 for maximum deflection. Use only enough generator output to provide usable indication on VTVM.
5.	"	"	"	45. 4MC	"	"	A5	Adjust for maximum deflection. Use only enough signal to produce 1 volt on VTVM.
6.	"	"	"	41. 25MC	"	"	A6	Increase generator output and adjust A6 for MINIMUM deflection.
7.	"	"	45MC (10MC Swp)	41. 25MC 42. 9MC 45. 75MC	"	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.		Use only enough sweep generator output to provide usable pattern on scope. SLIGHTLY retouch A1, A2 and A3 if necessary to obtain response curve similar to Fig. 1 with markers as indicated.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.01MFD	High side to pin 7 (grid) of 6AW8 (V6). Low side to chassis.	Not used.	4. 5MC (400∿ 30% AM Mod)	Any non-interfering channel.	Vert. amp. thru detector probe (Fig. 2) to pin 11 (cathode) of picture tube. Low side to chassis.	A7	Adjust for MINIMUM 400∿ indication on scope.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to pin 7 (grid) of 6AW8 (V6). Low side to chassis.	4. 5MC (400∿ FM 50KC Swp)	Not used.	Any non-interfering channel.	Across volume control.	A8, A9, A10	Use a very low signal level. Preset the buzz control (R6) at mid-range. Adjust A8, A9 and A10 for maximum 400∿ indication on scope.
10.	"	"	"	"	"	"	R6	Adjust signal generator output to the point where the 3BN6 just starts to limit. Adjust R6 for MINIMUM 400∿ indication on scope.
11.	"	"	"	"	"	"	A8	Increase generator output above limiting level. Readjust A8 for maximum 400∿ indication on scope.

ALTERNATE SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Set the buzz control (R6) at the mid-range position. Using a strong signal, adjust A8 for maximum sound output.
Reduce the signal strength, by either removing the antenna connection or inserting an attenuator between the antenna and the receiver terminals, below the limiting level of the 3BN6 as evidenced by a hiss in the sound similar to super regeneration. Adjust A9 and A10 for maximum sound output while keeping the signal below the limiting level.
Using a medium strength signal, adjust the buzz control for MINIMUM buzz.
Change to a strong signal and retouch A8 for maximum volume.

OSCILLATOR ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point Ⓐ. Positive to chassis.
The channel adjustment screws are reached through a hole above and just to the left of the channel selector shaft. The correct adjustment screw is accessible through this hole as the channels switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the center of its range.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211. 25MC 215. 75MC	13	Vert. amp. thru 47K to point Ⓑ. Low side to chassis.	A11	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should fall at 50%.
			207MC (10MC Swp)	205. 25MC 209. 75MC	12		A12	
			201MC (10MC Swp)	199. 25MC 203. 75MC	11		A13	
			195MC (10MC Swp)	193. 25MC 197. 75MC	10		A14	
			189MC (10MC Swp)	187. 25MC 191. 75MC	9		A15	
			183MC (10MC Swp)	181. 25MC 185. 75MC	8		A16	
			177MC (10MC Swp)	175. 25MC 179. 75MC	7		A17	
			85MC (10MC Swp)	83. 25MC 87. 75MC	6		A18	
			79MC (10MC Swp)	77. 25MC 81. 75MC	5		A19	
			69MC (10MC Swp)	67. 25MC 71. 75MC	4		A20	
			63MC (10MC Swp)	61. 25MC 65. 75MC	3		A21	
			57MC (10MC Swp)	55. 25MC 59. 75MC	2		A22	

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Connect bias as under "Oscillator Alignment".
Connect a 1000MMF capacitor from pin 1 (grid) of the 3CB6 (V3) to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205. 25MC 209. 75MC	12	Vert. amp. thru 10K to point ◇. Low side to chassis.	A23, A24, A25	Adjust for response curve similar to Fig. 4 with markers above 90%.
14.	"	"	213MC (10MC Swp)	211. 25MC 215. 75MC	13	"		Check for response similar to Fig. 4. If markers fall below 70% on any channel, make compromise adjustments of A23, A24 and A25 with channel switch set to that channel. Check all other channels to see that they have not been seriously affected. Remove the 1000MMF capacitor from V3.
			201MC (10MC Swp)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp)	55. 25MC 59. 75MC	2			

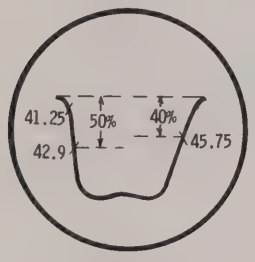


FIG.1

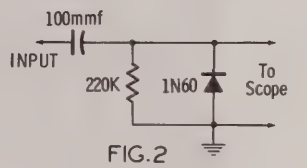


FIG.2

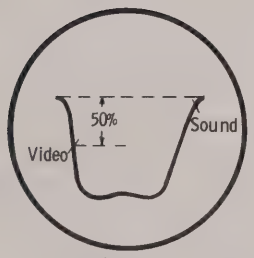


FIG.3

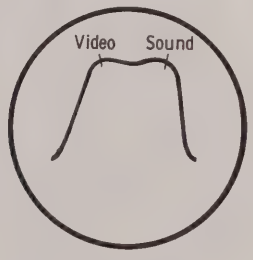
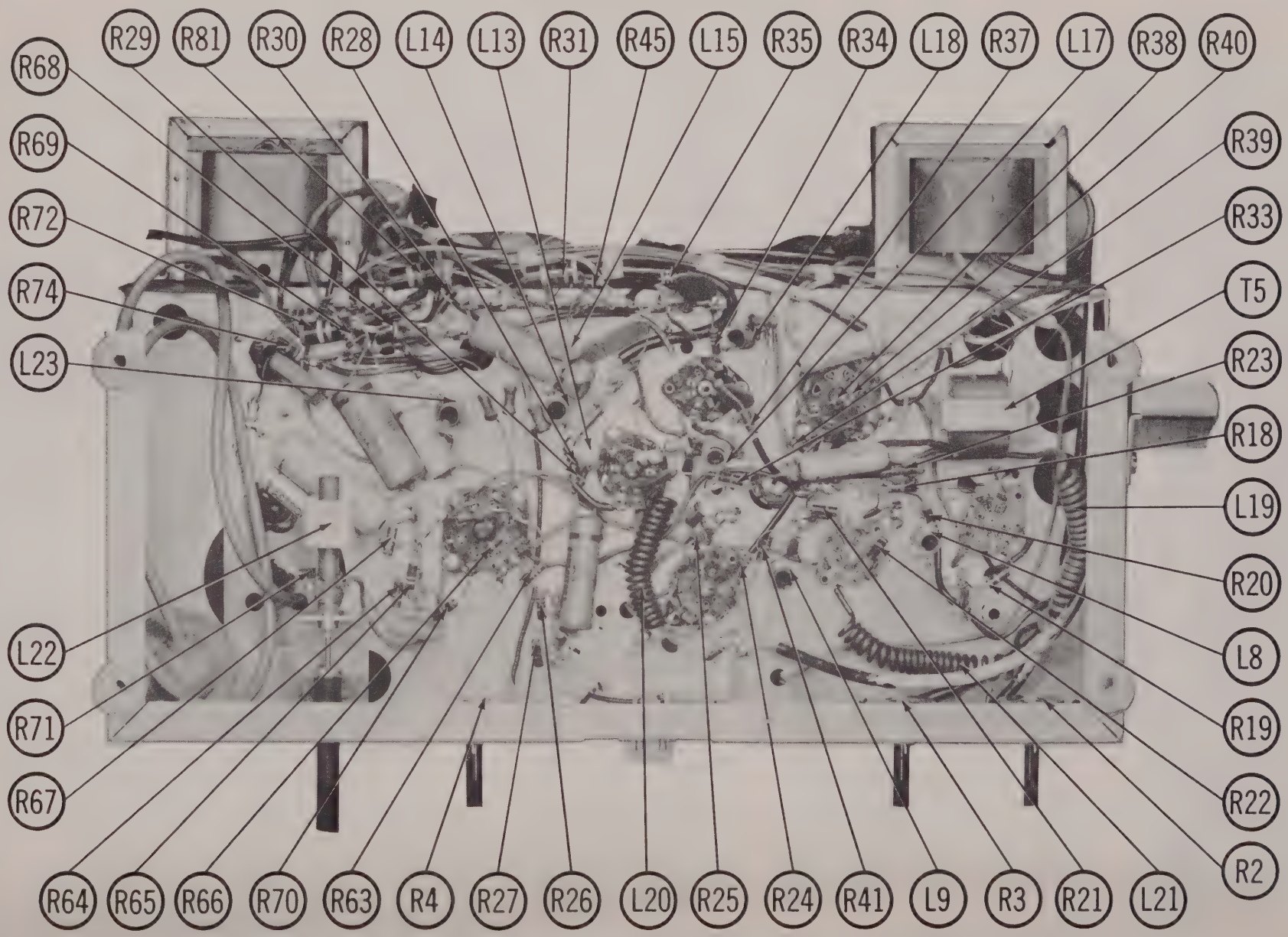
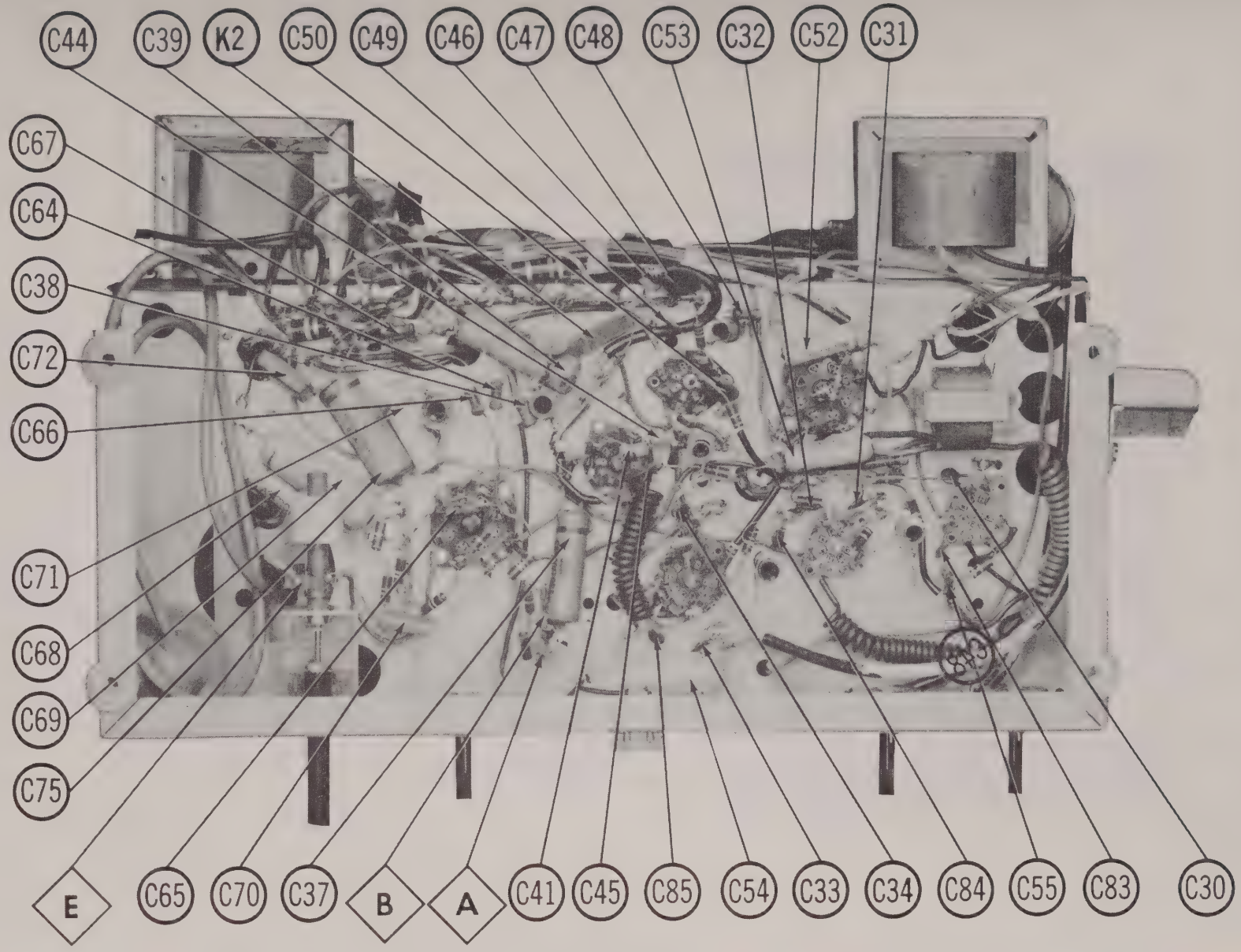


FIG.4



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



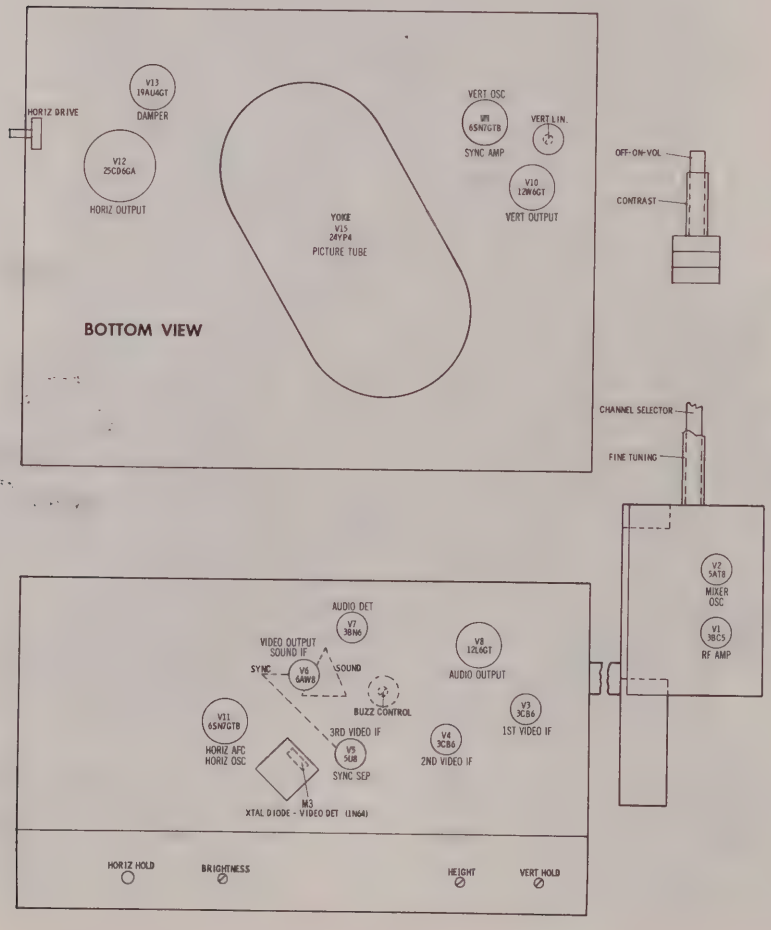
CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

SONORA MODELS
560, 567, 577, 578

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BC5	1Meg	0Ω	9Ω	8Ω	▪.1Ω	▪2200Ω	0Ω		
V2	5AT8	10K	▪3900Ω	0Ω	10Ω	9Ω	▪1000Ω	▪47K	0Ω	220K
V3	3CB6	1Meg	47Ω	10Ω	11Ω	▪150Ω	▪150Ω	0Ω		
V4	3CB6	1Meg	47Ω	8Ω	7Ω	▪150Ω	▪150Ω	0Ω		
V5	5U8	▪680K	.1Ω	▪470Ω	2.5Ω	4Ω	▪470Ω	180Ω	0Ω	2.2Meg
V6	6AW8	0Ω	56K	▪4700Ω	4Ω	5.5Ω	●1000Ω	1Meg	▪0Ω	†4800Ω
V7	3BN6	●450Ω	3.1Ω	2.5Ω	1.5Ω	▪4700Ω	5Ω	‡520K		
V8	12L6GT	TP	11Ω	†340Ω	†120Ω	†90K	NC	14Ω	35K	
V9	6SN7GTB	22K	▪9400Ω	0Ω	●550K	●†2.5Meg	0Ω	18Ω	17Ω	
V10	12W6GT	NC	17Ω	†440Ω	†65Ω	2.2Meg	NC	14Ω	●1100Ω	
V11	6SN7GTB	670K	▪0Ω	300K	250K	▪68K	0Ω	7Ω	5.5Ω	
V12	25CD6GA	NC	37Ω	0Ω	TP	150K	NC	31Ω	†7700Ω	TOP CAP ‡12Ω
V13	19AU4GT	NC	NC	100K	NC	†18Ω	NC	22Ω	18Ω	
V14	1X2B		PINS	1 THRU 9	HAVE	INFINITE	RESISTANCE			TOP CAP ‡322Ω
V15	24YP4	0Ω	2200Ω	Pin 6 0Ω	Pin 10 ‡4.7Meg	Pin 11 ●†120K	Pin 12 1.5Ω			

† MEASURED FROM OUTPUT OF M2.
‡ MEASURED FROM PIN 3 OF V13.
▪ MEASURED FROM 135V SOURCE.
● THIS READING CAN VARY, CONTROL SET FOR NORMAL OPERATION.
TP TIE POINT
NC NO CONNECTION



TUBE PLACEMENT CHART

CABINET—REAR VIEW

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HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Adjust the horizontal hold until the picture synchronizes horizontally.

Connect the vertical amplifier of the oscilloscope thru a low capacity probe to point (E). Readjust the horizontal hold if necessary to keep the picture in sync. Adjust the horizontal waveform slug (B1) for a waveform similar to Fig. 5 with the round and sharp peaks of equal amplitudes.

Adjust the horizontal drive trimmer (B2) for maximum width without vertical white drive lines or compression near the center of the screen.

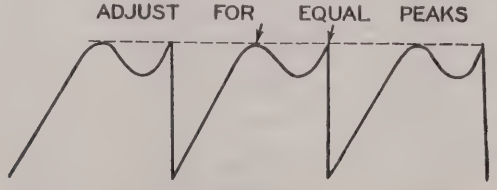


FIG. 5

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amp.	3BC5	
V2	Mixer-Osc.	6AT8	
V3	1st Video IF Amp.	3CB6	
V4	2nd Video IF Amp.	3CB6	
V5	3rd Video IF Amp.		
	Sync. Sep.	9U8	
V6	Video Output-Sound IF	6AW8	
V7	Audio Det.	12BH8	
V8	Audio Output	12L6GT	
V9	Vert. Osc. -Sync Amp.	6SN7GTB	
V10	Vert. Output	12W6GT	
V11	Horiz. AFC - Horiz. Osc.	6SN7GTB	
V12	Horiz. Output	1X/2000A	
V13	Damper	1B4/1.4GT	
V14	HV Rectifier	1X2B	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	SONORA PART No.	RCA PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V15	24TP4	24TP4	24TP4 ①	24TP4 ② 24DP4A ② 24QP4	L Aluminized ② Silver Screen '55

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP	VOLT	SONORA PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	20	150	R-1957	PRI-175	BR20015	WS342	TD-200-150	S-110	TVA-1423
C1A	160	300	R-1953	PRI-190		WT449		TVA-3620	TVA-3620
P	200	150						MT-15190	
C2A	120	300	R-1958	PRI-046				Q-183	R3580*
B	100	300						S-185	
C	200	25							
C4	200	150	R-1956	PRI-075	BR30015	WS342	TD-200-150	S-110	TVA-1423

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	SONORA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	1000		R-1449	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1
C6	1000		R-1449	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1
C7	5		13L-5C05DJ	MPG-01 S	TCE-5	C10V5C	TCO-5	ET-555	5TCCD-V47
C8	68		13L-5UA68DK	NTSG-01 SS	TCN-68	C10Q68U	TCT-68		5TCC-Q68
C9	33		13L-5C03DJ	MPG-01 S.5	TCE-5.3	C10V3SC	TCO-5.3		
C10	5.3				SSB-3		31L5-D	CT585A	
C11	120		13L-5V12JK	BPD-00012	DD-121	BYA5DL	RD-100	UC-5313	5GA-T12
C12	1000		13M350AJ02EC	EF-001	MFT-1000				500C-D1
C13	5.3				SSB-3		31L5-D	CT585A	
C14	1000		R-1449	BPD-001	DD-102	BYA5DI	RD-100	DC521	5HK-D1
C15	1000		13M350KA02EC	EF-001	MFT-1000				500C-D1
C16	5.3				SSB-3		31L5-D	CT585A	
C17	80		13M-350-Q800J						
C18	1000		13M350AJ02ZC	EF-001	MFT-1000				500C-D1
C19	68		13L-5UC47BJ	NTSG-01 47	TCN-47	C10Q47U	TCT-47	NT-5447	5TCU-Q47
C20	470		13L-5X471Z	BPD-00047	DD-471	BYA10T47	RD-470	UC-5847	5GA-T47
C21	1000		13M350KA02EC	EF-001	MFT-1000				500C-D1
C22	10		13L-5Q00A						
C23	10		13L-5UA10KD						
C24	1000		13M350KA02EC	EF-001	MFT-1000				500C-D1
C25	1000		R-1449	BPD-001	DD-102	BYA5DI	RD-1000	DC521	5HK-D1 Note 1
C26	1000		13M350KA02EC	EF-001	MFT-1000				500C-D1 Note 1
C27	1000		R-1449	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1
C28	1500		13L-5U152JZ	BPD-00015	DD-152	BYA10D15	RD-1500	DC515	5HK-D1 Note 1
C29	33			MPG-01 S3	TCE-33	C10Q33C	TCO-33		5TCC-Q33
C30	1000		R-1447	BPD-001	DD-103	BYA5DI	RD-1000	DC521	5HK-D1
C31	1000		R-1447	BPD-001	DD-103	BYA5DI	RD-1000	DC521	5HK-D1
C32	1000		R-1447	BPD-001	DD-103	BYA5DI	RD-1000	DC521	5HK-D1
C33	1000		R-1447	BPD-001	DD-103	BYA5DI	RD-1000	DC521	5HK-D1
C34	1000		R-1447	BPD-001	DD-103	BYA5DI	RD-1000	DC521	5HK-D1
C35	1000		R-1447	BPD-001	DD-103	BYA5DI	RD-1000	DC521	5HK-D1
C36	4.7		R-1440	MPG-01 4.7	TCE-4.7	C10V4.7C	TCO-4.7	ET-5547	5TCCB-V47
C37	047	300	R-1463	BPD-05	DF-503	CUB4047		GEM-4147	5TM-D47
C38	33		M-9049	MPG-01 33		C10Q33C			5TCC-Q33
C39	.1	600	M-1623	P48M-1	DP-104	CUB4P1		GEM-601	4TM-P1
C40	.1	600	M-1623	P48M-1	DP-104	CUB4P1		GEM-601	4TM-P1
C41	3		R-104	MPG-01 3	TCE-3	C10Y3C	TCO-3		2T-553
C42	68		M-7944	MPG-01 68	TCE-68	C10Q68C	TCO-68		5TCC-Q68
C43	47		R-1445	MPG-01 47	TCE-47	C10Q47C	TCO-47		5TCC-Q47
C44	6.3		R-1441	MPG-01 6.3	TCE-6.3	C10Y6SC	TCO-6.3		
C45	10000		M-9063	BPD-01	DD-103	BYA5DL	RD-10000	DC521	5HK-D1
C46	1000		R-1447	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1
C47	10000		M-9063	BPD-01	DD-103	BYA5DL	RD-10000	DC521	5HK-D1
C48	15		R-1444	MPG-01 15	TCE-15	C10Q15C	TCO-15		5TCC-Q15
C49	10000		M-9063	BPD-01	DD-103	BYA5DL	GP-10000	DC521	5HK-D1
C50	10000		M-9063	BPD-01	DD-103	BYA5DL	GP-10000	DC521	5HK-D1
C51	.047	600	R-1463	P48M-2	DP-104	CUB4P47		GEM-4147	4TM-P47
C52	.033	400	R-1461	BPD-05	DF-203	CUB4D33		GEM-4123	4TM-D33
C53	.033	400	R-1461	BPD-05	DF-303	CUB4D33		GEM-4123	4TM-S33
C54	.33	300	R-1465	P33M-32		CUB3P33		GEM-3232	3TM-P33
C55	1000		R-1447	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1
C56	.047	200	R-1463	BPD-05	DF-503	CUB3047		GEM-3147	3TM-S47
C57	01	600	R-1460	BPD-05	DD-103	CUB4S1		GEM-611	4TM-S1
C58	.047	600	R-1463	BPD-05	DF-503	CUB4047		GEM-4147	4TM-S47
C59	.047	600	R-1463	P48M-2		CUB4P33		GEM-4122	4TM-P22
C60	.22	600	R-1460	P48M-22		CUB4P22		GEM-4122	4TM-P22
C61	.047	600	R-1464	BPD-05	DF-503	CUB4047		GEM-4147	4TM-S47
C62	.0033	600	R-1460	BPD-0033	DS-332	CUBED33		GEM-5233	5TM-D33
C63	.047	400	R-1463	BPD-01	DF-503	CUB4047		GEM-4147	4TM-D47
C64	33		M-9049	MPG-01 33	TCE-33	C10Q33C	TCO-33	ET-5433	5TCC-Q33
C65	33		M-9077	MPG-01 33	TCE-33	C10Q33C	TCO-33	ET-5433	5TCC-Q33
C66	33		M-9077	MPG-01 33	TCE-33	C10Q33C	TCO-33	ET-5433	5TCC-Q33
C67	68		M-7944	MPG-01 68	TCE-68	C10Q68C	TCO-68		5TCC-Q68
C68	.022	400	R-1461	BPD-02	DF-303	CUB4S22		GEM-4122	4TM-S22
C69	.22	200	R-1465	P28M-22		CUB2P22		GEM-2222	2TM-P22
C70	.22	400	R-1460	P48M-22		CUB4P22			4TM-P22
C71	.01	600	R-1459	BPD-01	DD-103	CUB4S1		GEM-611	4TM-S1
C72	1500		R-1454	1467-0015		9WS015		9GS-215	9GS-215
C73	5000		M-8373	BPD-005	DD-502	BYA10D5	GP-5000	DC525	5HK-D5
C74	.33	400	R-1466	P48M-33		CUB4P33		GEM-4033	4TM-P33
C75	1	600	M-7793	P48M-1	DP-104	CUB4P1		GEM-601	4TM-P1
C76	.22	400	R-1466	P48M-22		CUB4P22		GEM-4022	4TM-P22
C77	33	400	R-1466	P48M-33		CUB4P33		GEM-4033	4TM-P33
C78	10000		M-9063	BPD-01	DD-103	BYA5DL	GP-10000	DC521	5HK-D1

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	SONORA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C79	1	200	N 1551	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C80	82	3000	R-1424			BYA30S82		DC30482	30GA-Q82	
C81	56	2000	R-1446			BYA20S56		DC20456	20GA-Q56	
C82	1000		R-1447	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1	Note 1
C83	1000		R-1447	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1	
C84	1000		R-1447	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1	
C85	1000		R-1447	BPD-001	DD-102	BYA5DI	ED-1000	DC521	5HK-D1	
C86	.01	600	R-1459	BPD-01	DD-103	CUB4S1		GEM-611	4TM-S1	

Note 1: Not used in some versions.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SONORA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No	
R1A	1000	1	R-1953	F1-5			UF13R	Contrast
B	500K	1		RS-41			UB55A	Volume
C	Switch			KS-1			US-28	
R2A	500K	½	R-1413	AB-59	A47-500K-8	QU-133	PTA55L	Vert. Hold
B	Shaft			AK-19	RM-3	TQ	Not Req.	
R3A	5Meg	½	R-1412	AB-67	A47-5Meg-8	QU-140	PTA56R	Height - Note 1
B	Shaft			AK-19	RM-3	TQ	Not Req.	
R4A	100K	½	R-1453	AB-40	A47-100K-8	QU-138	PTA15L	Brightness
B	Shaft			AK-19	RM-3	TQ	Not Req.	
R5	1000	2	R-1410		39-1000		FL-1.5K	Vert. Lin. (Wire-wound)
R6	500	2	R-1411		39-500		FL-500	Buzz (Wire-wound)

Note 1. Part #R-1412 may be 3Meg in some versions.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SONORA PART No.	IRC PART No.	
R1	470K		R1S-470K	BTS-470K	
R2	470K		R1S-470K	BTS-470K	
R9	680K		R1S-680K	BTS-680K	
R10	10K		R1S-10K	BTS-10K	
R11	3300Ω		R1S-3300	BTS-3300	
R12	3900Ω		R1S-3900	BTS-3900	
R13	230K		R1S-230K	BTS-230K	
R14	1000Ω		R1S-1000	BTS-1000	
R15	2900Ω		R1S-2900	BTS-2900	
R16	47K		R1S-47K	BTS-47K	
R17	10K		R1S-10K	BTS-10K	
R18	150Ω		R1S-150	BTS-150	
R19	47Ω		R1S-47	BTS-47	
R20	1000Ω		R1S-1094	BTS-1000	
R21	150Ω		R1S-1260	BTS-150	
R23	47Ω		R1S-4737	BTS-47	
R22	1000Ω		R1S-1094	BTS-1000	
R24	470Ω		R1S-4701	BTS-470	
R25	180Ω		R1S-4097	BTS-180	
R26	6800Ω		R1S-4630	BTS-6800	
R27	1Meg		R1S-1252	BTS-1Meg	
R28	1Meg		R1S-1263	BTS-1Meg	
R29	82Ω		R1S-4737	BTS-82	
R30	100K		R1S-1778	BTS-100K	
R31	1000Ω	3	R1S-7015	BTS-1000	
R33	56K		R1S-4823	BTS-56K	
R34	4700Ω		R1S-4379	BTS-4700	
R35	470K		R1S-4738	BTS-470K	
R36	47K		R1S-7154	BTS-47K	
R37	4700Ω		R1S-4378	BTS-4700	
R38	180K 5%		R1S-7503	BTS-180K 5%	
R39	180K 5%		R1S-7491	BTS-180K 5%	
R40	82K		R1S-8015	BTS-82K	
R41	680K		R1S-7463	BTS-680K	
R43	33K		R1S-4035	BTS-33K	
R43	560K		R1S-7190	BTS-560K	
R44	4700Ω		R1S-4378	BTS-4700	
R45	4700Ω		R1S-4378	BTS-4700	

ITEM No	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SONORA PART No.	IRC PART No.	
R46	27K		R1S-4451	BTS-27K	
R47	330K		R1S-7005	BTS-330K	
R48	470K		R1S-4094	BTS-470K	Note 1
R49	1.5Meg		R1S-4470	BTS-1.5Meg	
R50	1Meg		R1S-1263	BTS-1Meg	
R51	2.5Meg		R1S-4737	BTS-2.5Meg	
R52	100K		R1S-1093	BTS-100K	
R53	100K		R1S-1093	BTS-100K	
R54	150K		R1S-4468	BTS-150K	
R55	150K		R1S-4468	BTS-150K	
R56	47K		R1S-4468	BTS-47K	
R57	220Ω		R1S-4737	BTS-220	
R58	330Ω		R1S-4737	BTS-330	
R59	680Ω		R1S-4454		
R60	680Ω		R1S-4454		
R61	8200Ω		R1S-4497	BTS-8200	
R62	3300Ω		R1S-4737	BTS-3300	
R63	3300Ω		R1S-5053	BTS-3300	
R64	560K		R1S-7190		
R64	150K		R1S-4468		
R65	150K		R1S-4468		
R66	2.5Meg		R1S-9037		
R67	820Ω		R1S-4497	BTS-820	
R68	150K		R1S-4468		
R69	82K		R1S-5093		
R70	100K		R1S-1093	BTS-100K	
R71	47K	2	R1S-7174		
R72	100K	2	R1S-1093		
R73	10K		R1S-4495		
R74	4.7Meg		R1S-9019		
R75	150K		R1S-4468		
R76	470		R1S-7187		
R77	6300		R1S-4679	BTS-630	
R78	4700Ω	2	R1S-7018	BTS-4700	
R79	4700Ω	2	R1S-7018	BTS-4700	
R80	9.5Ω	3, 5	R1S-1529	PW4-10	
R81	1000Ω	3	R1S-4039	BTS-100	
R82	5.5Ω	5	R1S-1409	FR5.5	
R83	330K		R1S-4026	BTS-320K	
R84	33K	2		BTS-33K	Note 1

Note 1: Not used in some versions.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA							NOTES
		SONORA PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	Vert. Osc. Trans.	R-1425	S6703 Ⓓ	A-3003 Ⓓ	20VT1 Ⓓ	V405 Ⓓ	A-8125 Ⓓ	25A03 Ⓓ	A-97X Ⓓ	
T2	Horiz. Output Trans.	R-1947	21641P1	21VO-37X		A122P Ⓓ	A90-2674	FLY-35*Ⓓ	D-49*1	
T3	Horiz. Output Trans.	R-1418	21200 Ⓓ	A-2622				28871		
T4A	Yoke(90°)Horiz(21MH)	R-1948	DF608 6.5 Ⓓ	MDF-91 6	23TD1 Ⓓ	Y90U12/47 Ⓓ	DY-12A Ⓓ	Y-16 Ⓓ	Y-42-2 Ⓓ	
B	Vert(ST.5MH)	R-1404 Ⓓ							YC-1 Ⓓ	

① Drill new mounting hole(s) .
② Use 8 to 1 horiz. ratio.
③ Yoke rear cover and centering device.
④ Connect yoke terminal #3 to horiz. output transformer terminal #7. Connect yoke terminal #1 to capacitor C79.
⑤ Use original yoke rear cover and centering device.
⑥ Use original horiz. yoke damping network if necessary.
⑦ Connect horiz. network across yoke terminals #3 and #7.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL (CONNECTIONS)	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
6	6	6	3	3	5	6	6
7	3	3	7	5	3	3	3
3	N.C. See Note ③	N.C. See Note ③	N.C. See Note ③	N.C. See Note ③	N.C. See Note ③	N.C. See Note ③	N.C. See Note ③
2	2	2	6	1	2	2	2

③ Remove capacitor C82 from circuit. Connect approx. 100MFD @ 4KV capacitor across horiz. yoke terms. if insufficient width.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI	SEC	SONORA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T5	2000Ω	3-4Ω	R-1419	Z10H Ⓓ	A-3035 Ⓓ	A-3339 Ⓓ	20S68	S-13X Ⓓ	Ⓓ Drill one new mtg. hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V C IMP	SONORA PART No	QUAM PART No	
SPI	4" X 6"	PM	3-4Ω	R-1946	4SA01	

COILS (RF-IF)

ITEM No.	USE	SONORA PART No.	NOTES
L1	Ant. Coils	31T-413	
L2	Ant. Trap Coil	31T-416	
L3	Ant. Trap Coil	31T-416	
L4A	Ant., RF, Mixer Grid, Osc. Coils	31M-303B	Channel 3
A	Ant., RF, Mixer Grid, Osc. Coils	31M-303B	Channel 3
B	Ant., RF, Mixer Grid, Osc. Coils	31M-304B	Channel 4
C	Ant., RF, Mixer Grid, Osc. Coils	31M-304B	Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	31M-305B	Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	31M-306B	Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	31M-307B	Channel 7

ITEM No.	USE	SONORA PART No.	NOTES
L4G	Ant., RF, Mixer Grid, Osc. Coils	31M-303B	Channel 6
H	Ant., RF, Mixer Grid, Osc. Coils	31M-303B	Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	31M-304B	Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	31M-311B	Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	31M-312B	Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	31M-313B	Channel 13
L5	Mixer Plate Coil		

ITEM No.	USE	REPLACEMENT DATA				NOTES
		SONORA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L6A	1st Video IF	R-1423			6231	
B	4L 21MC Trap	R-1431	19-6023*			Includes C38, 39 Microhenries; Wound on 47000 resistor.
L7	Coil	R-1431	19-6023*			
L8	2nd Video IF	R-1444	17-4334	TV-130	6234	
L9	3rd Video IF	R-1444	17-4334	TV-130	6234	
L10	4th Video IF	R-1427	17-4323	TV-130	6216	
L11	Limiter	R-1439				IL 7 Microhenries
L12	Series Peaking Coil	R-1470	19-3093	TV-151	6177	88 Microhenries
L13	Series Peaking Coil	R-1860		TV-130a	6184	186 Microhenries; Wound on 12K resistor.
L14	4.5MC Trap	W-9011	30-1004	TV-151	1470	
L15	Shunt Peaking Coil	R-1949	19-5100a			1140 Microhenries; Wound on 47000 resistor.
L16	1st Sound IF	R-1435	17-2400	TV-151	1469	
L17	2nd Sound IF	R-1430	30-1000			Tapped @ .4Ω and 1.4Ω
L18	Quadrature Coil	R-1407	30-1000		1480	
L19	B+ Choke	R-1870	19-1001		4604	1.8 Microhenries
L20	Fil. Choke	R-1869	19-1001		4604	1.3 Microhenries
L21	Fil. Choke	R-1473	19-1001		4604	1.5 Microhenries

* Parallel with 4700Ω resistor.
▲ Parallel with 12K resistor
■ Parallel with 10K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES		REPLACEMENT DATA						NOTES
	PRI	SEC	SONORA PART No	MEISSNER PART No	MERIT PART No	RCA TYPE No	Ram PART No	Thordarson PART No	
L23	65Ω		R-1408					RS-7	Tapped @ 48Ω Horiz. Osc. Horiz. Waveform
L23	44Ω		R-1405					RS-8	

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE @ CURRENT 1000 ^Cy	SONORA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L24	.250A	180	1 HY	R-1408	C6087	C-3996	C-3338	26C44 Ⓓ	C-17X

① Drill one new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SONORA PART No.	REPLACEMENT DATA
R1	Vertical Intergrator	22K, 10K, 4700MMF, 4700MMF	R-1458	Aerovox PA-383-2 Centralab PC-108 Sprague T-5
R2	Sync Coupler	10K, 330K, 3.3Meg, 10000MMF, 270MMF, 25MMF	R-1459	Centralab PC-280 Sprague ET-1

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA							
	CURRENT (Measured)	SONORA PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.
M1	.250A	R-1423 ①	1023A ↓	1N1007 Ⓓ	RS350SL ↓	6S350 ↓	6QA3 ↓	350A Ⓓ
M2	.250A	R-1423 Ⓓ	1023A ↓	1N1007 Ⓓ	RS350SL ↓	6S350 ↓	6QA3 Ⓓ	350A Ⓓ

↓ Selenium type.
Ⓓ Germanium type.

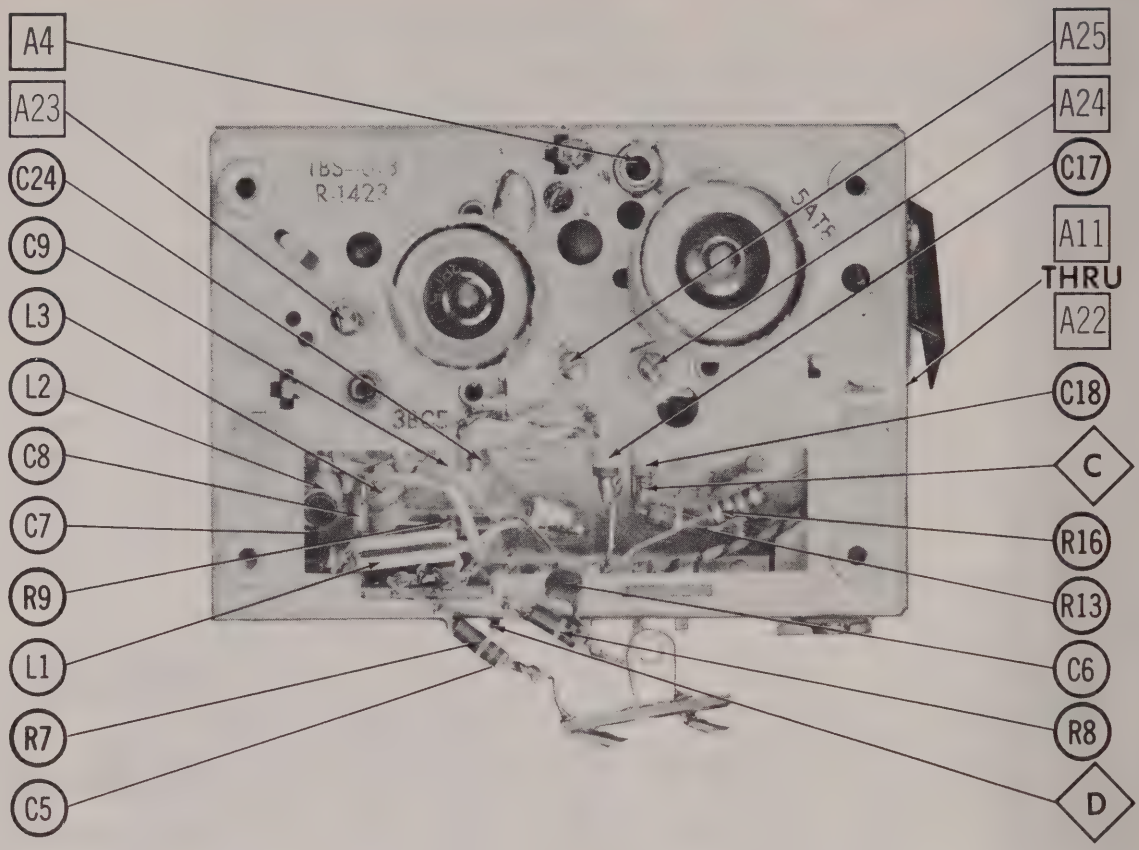
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		SONORA PART No.	SYLVANIA PART No	
M3	1N54	1N54	1N60	Video Detector (Pigtail)

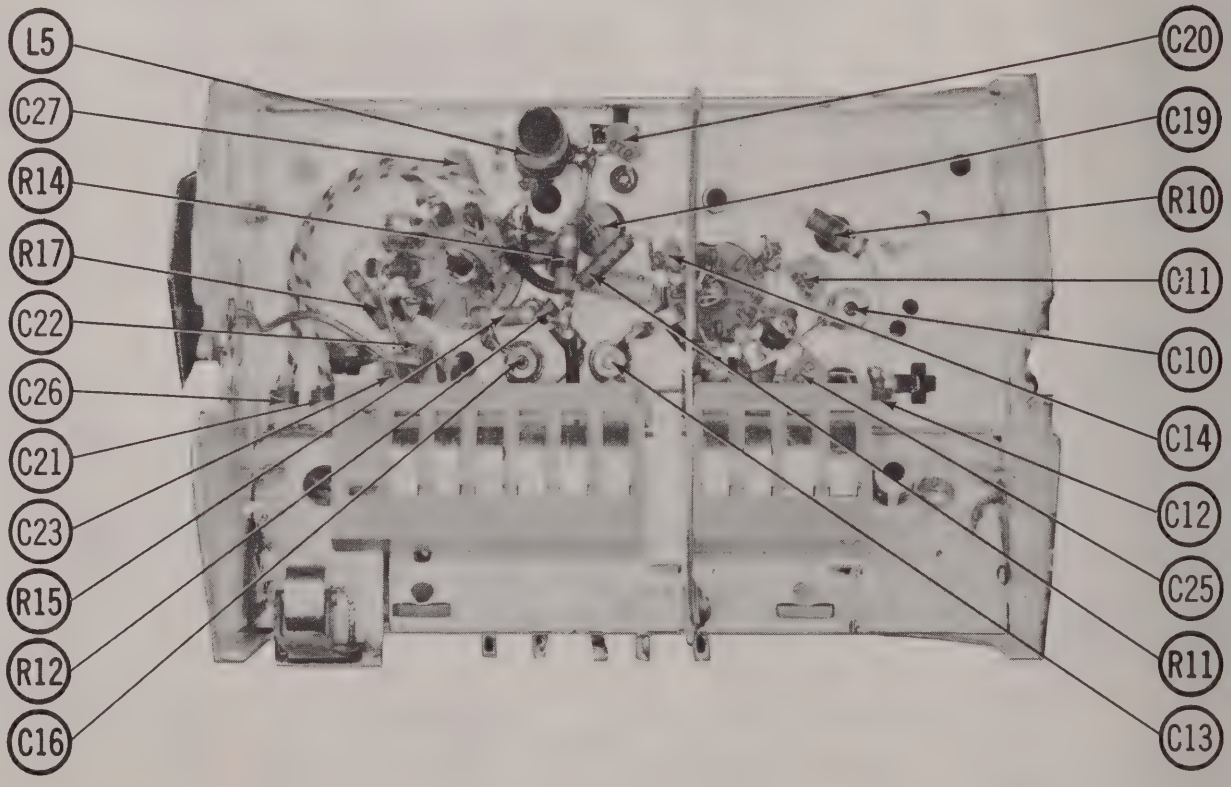
MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No	NOTES
M4	Tuner	R-1423	VHF
M5	Centering Device	R-1404	Includes Yoke Cover.
M6	1st Trap	R-9012	
	Trimmer Cap.	20B512238	Horiz. Drive, Mica (23-175MMF) Not used in some versions.

SONORA MODELS 560, 567, 577, 578



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW

SONORA MODELS 600, 601, 602, 603, 658, 659, 660, 661

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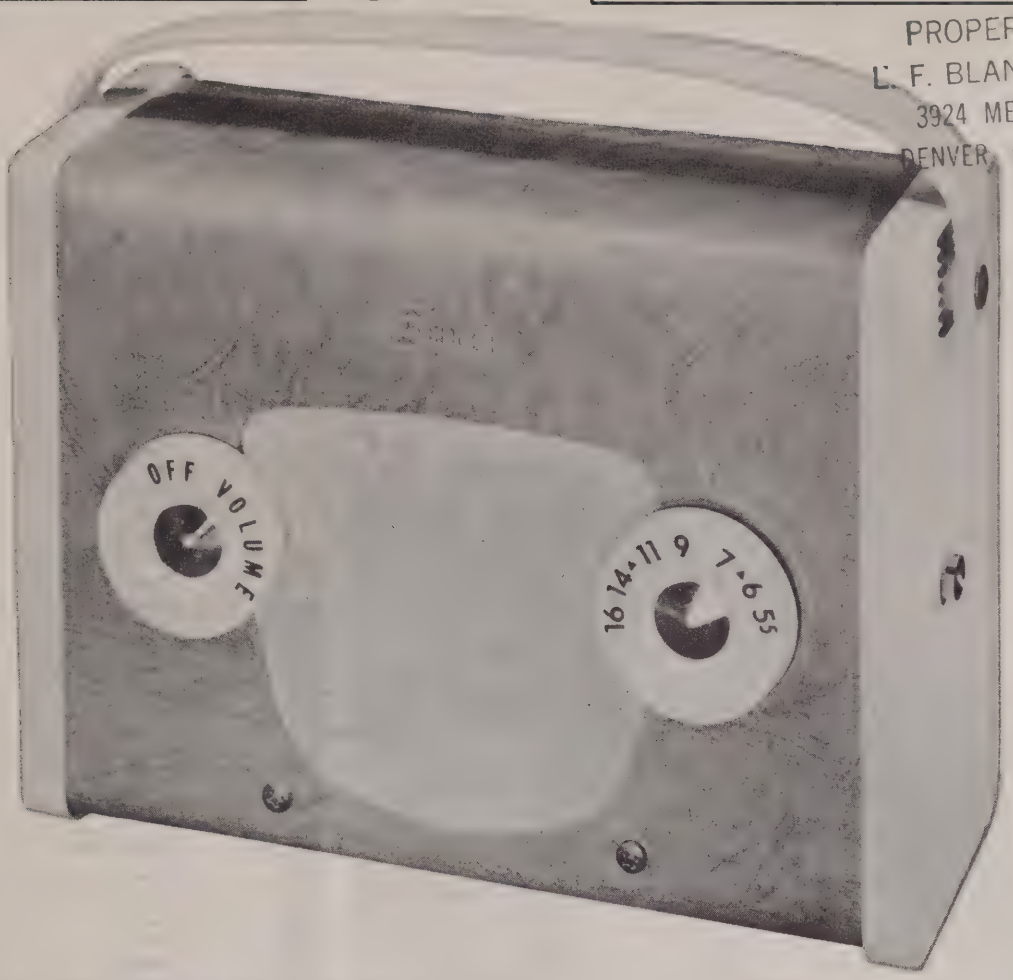
SONORA MODELS 600, 601, 602, 603, 658, 659, 660, 661



SONORA MODELS 600, 601, 602, 603, 658, 659, 660, 661

TRADE NAME	Sonora Models 600, 601, 602, 603, 658, 659, 660, 661
MANUFACTURER	Sonora Radio & Tel. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	Battery Operated Portable AM Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det-AVC-AF Amp., 3V4 Output
POWER SUPPLY	1.5 Volts "A" Supply & 75 Volts "B" Supply RATING 240MA @ 1.5 Volts DC & 9MA @ 75 Volts DC
TUNING RANGE—BROADCAST	540KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal.	"	A6	Fashion loop of several turns or wire and radiate signal into loop of receiver. Adjust for maximum output.

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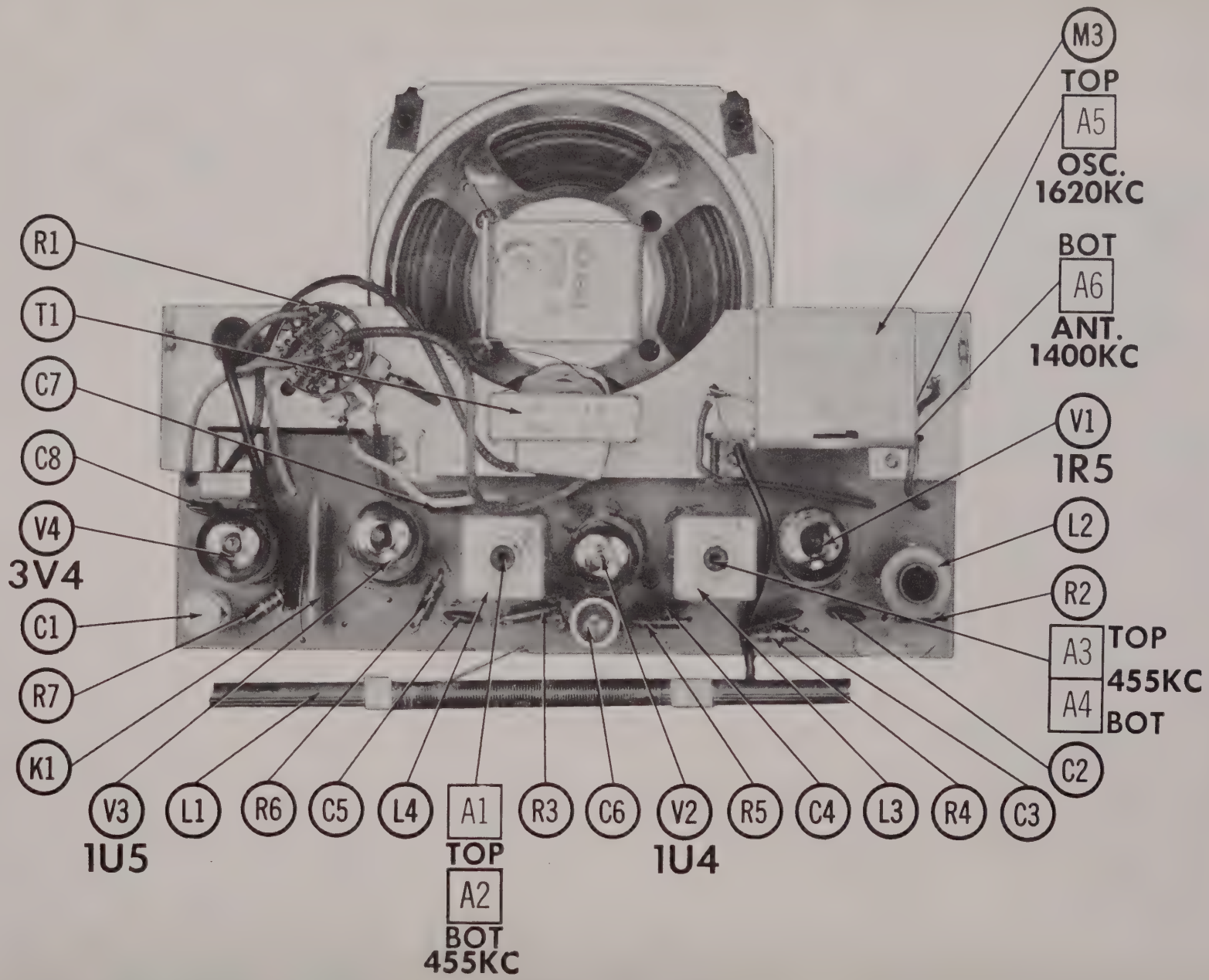


CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1U4	
V3	Det-AVC-AF Amp.	1U5	
V4	Output	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SONORA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	6	150		SRE150V10	BBR8-150	TC41		MMT-1505	TVA-1405

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SONORA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	47			BPD-00047	DD-470	L10Q47	ED-47	UC-5447	5GA-Q47	
C3	5000			BPD-005	DD-502	BYA6D5	ED-005	DC525	5HK-D5	
C4	5000			BPD-005	DD-502	BYA6D5	ED-005	DC525	5HK-D5	
C5	100			BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C6	.047	200		BPD-05	DF-503	CUB2S47		GEM-4147	2TM-S47	
C7	1500			BPD-0015	DD-152	BYA10D15	ED-0015	DC5215	5HK-D15	
C8	1500			BPD-0015	DD-152	BYA10D15	ED-0015	DC5215	5HK-D15	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SONORA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1Meg	½	R-2304	B-70	A47-1Meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-2	SWE-20	76-2	US-27	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SONORA PART No.	IRC PART No.	
R2	100K			BTS-100K	
R3	2. 2Meg			BTS-2. 2Meg	
R4	10K			BTS-10K	
R5	10Meg			BTS-10Meg	
R6	10Meg			BTS-10Meg	
R7	470Ω			BTS-470	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SONORA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1050Ω	3-4Ω	R-2314	Z1117 ①	A-2998②	A-3879①	24S52 ①	S-11X ②	① Drill mtg. holes. ② Bend ears down.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SONORA PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	R-2312	4A07	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		SONORA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick					
L2	Osc. Coil					
L3	Input IF	R-2307	16-6780	BC-356	13-PC1	
L4	Output IF	R-2307	16-6780	BC-357	13-PC2	

COMPONENT COMBINATIONS

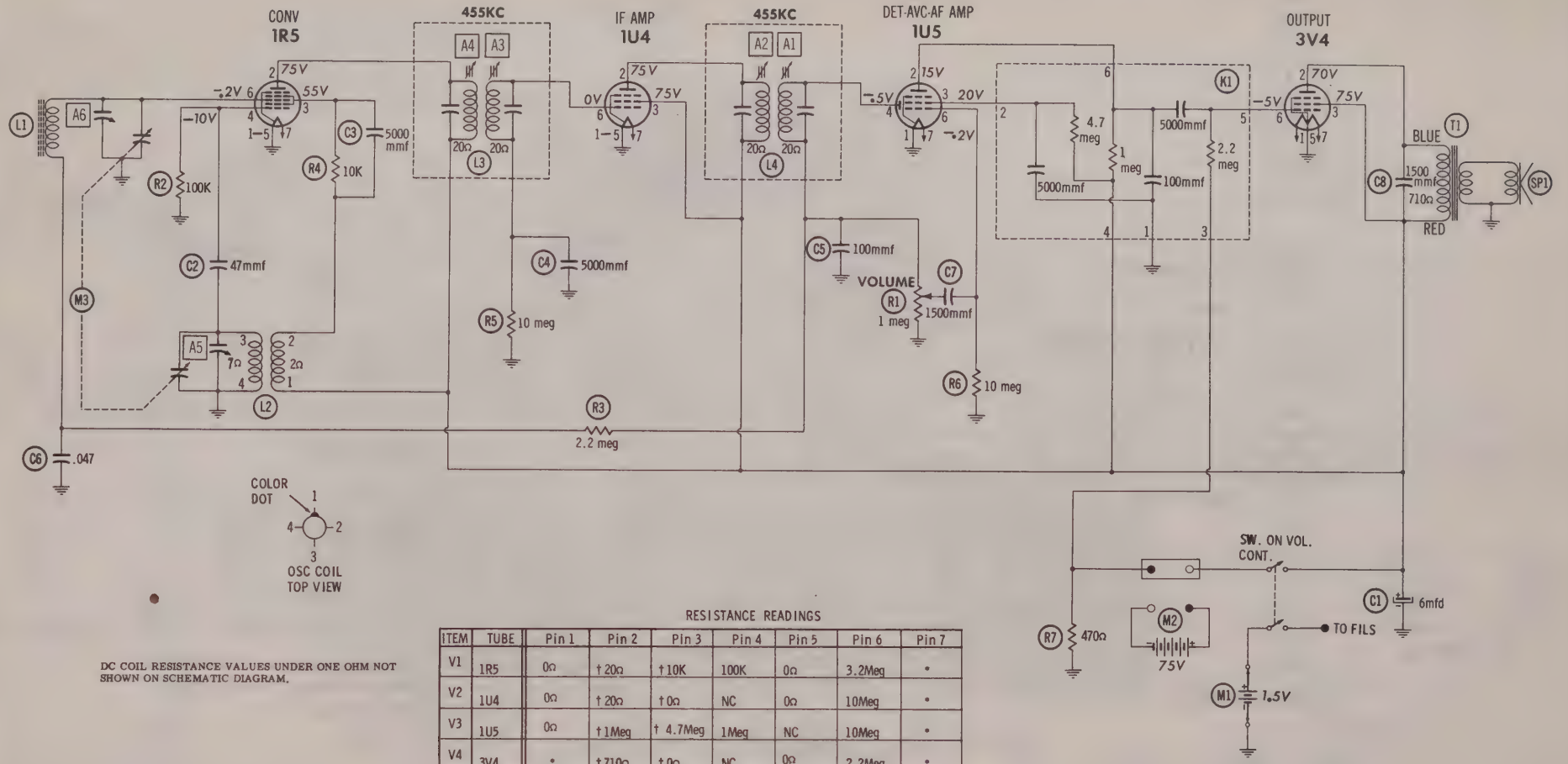
ITEM No.	USE	DESCRIPTION	SONORA PART No.	REPLACEMENT DATA	
K1	Audio Coup. Net.	5000MMF, 100MMF, 5000MMF, 2. 2Meg, 4. 7Meg, 1Meg	R-2308	Aerovox	PA-117
				Centralab	PC-91
				Cornell-Dubilier	114TM2
				Erie	1407-03
				Sprague	P-2

BATTERIES

ITEM No.	VOLTAGE	SONORA PART No.	REPLACEMENT DATA								
			BURGESS			EVEREADY			MALLORY		
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	"A"	"B"	"A-B"
M1	1.5V "A"		21R			964			M-20		
M2	75V "B"			XX50			437			M-212	

MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
M3	Tuning Cap.	R-2305	Two Gang (19-290MMF, 14-115MMF)



DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	0Ω	†20Ω	†10K	100K	0Ω	3.2Meg	•
V2	1U4	0Ω	†20Ω	†0Ω	NC	0Ω	10Meg	•
V3	1U5	0Ω	†1Meg	† 4.7Meg	1Meg	NC	10Meg	•
V4	3V4	•	†710Ω	†0Ω	NC	0Ω	2.2Meg	•

• DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM POSITIVE SIDE OF C1.
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal apllied for voltage measurements.

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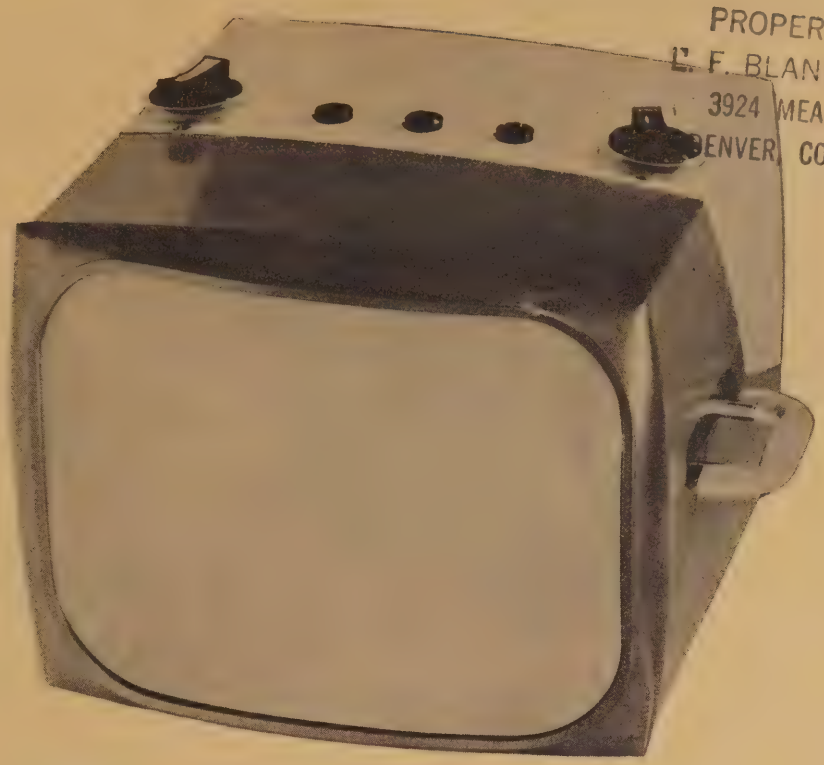

TRUETONE
MODELS 2D2720A, B

TRUETONE MODEL 2D2720A

TRADE NAME	Truetone Models 2D2720A, 2D2720B
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	105-115 Volts AC, 60 Cycles RATING 155 Watts, 1.4 Amp. @ 115 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 46.75MC, Sound IF 42.25MC (Intercarrier)

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DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 7 push on type control knobs.
2. Remove 4 metal screws, remove tuner antenna leads, remove rear cover.
3. Place the receiver face down on a pad.
4. Remove 2 metal screws holding AC interlock bracket.
5. Remove 2 speaker leads.
6. Remove 2 metal screws at front of cabinet, one on top, one on bottom.
7. Remove 4 chassis screws from sides of cabinet.
8. Lift cabinet up to remove.
9. Remove 2 speaker bolts, remove speaker.

MODEL
2D2720A

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

Care should be exercised when connecting test equipment or physcially contacting chassis.

TRUETONE
MODELS 2D2720A, B

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Tuner Oscillator it is necessary

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning it is necessary to remove the chassis. (See disassembly instructions)

FOCUS ADJUSTMENT

Adjust the ion trap for best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the chassis. Adjustment is located on top of the chassis. Set the horiz. hold control to the center of its range and adjust the horiz. frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate the sound IF detector buzz, adjust the buzz control located on top of the chassis for maximum sound with minimum buzz.

FUSES

A 9.1Ω fusible resistor R83 is used for LV Power Supply protection.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

ANTI-PIN CUSHION CORRECTION

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that the sides are staright.

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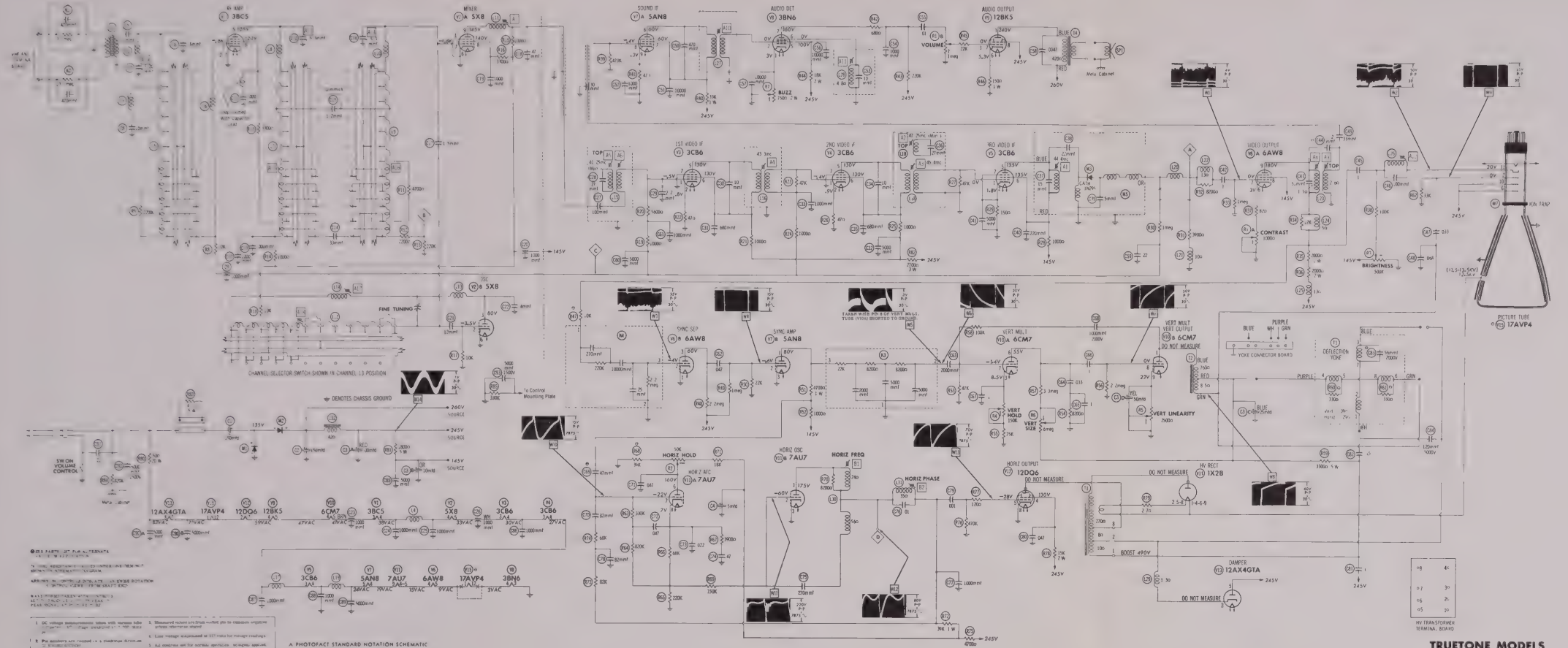

TRUETONE MODELS
2D2720A, B

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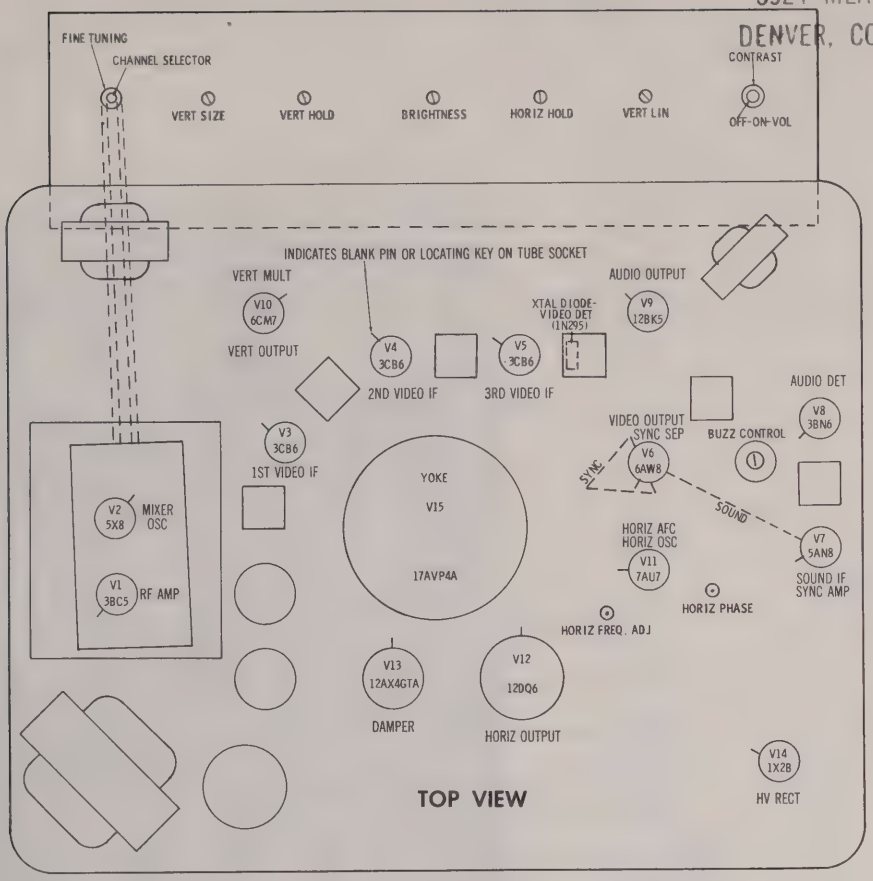
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

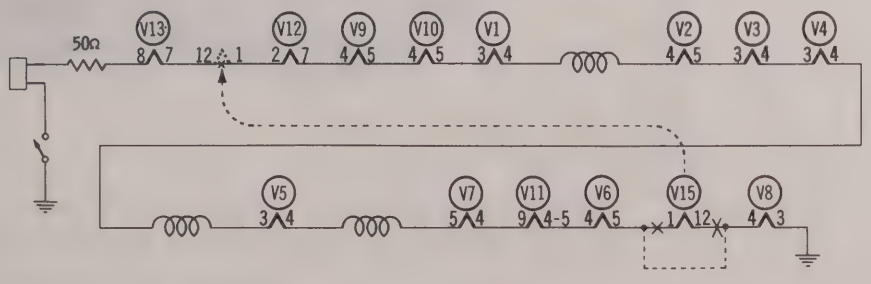
POWER SUPPLY FAILURE
No raster, no sound - **Fusible Resistor (R83), Rectifier (M1, M2)**

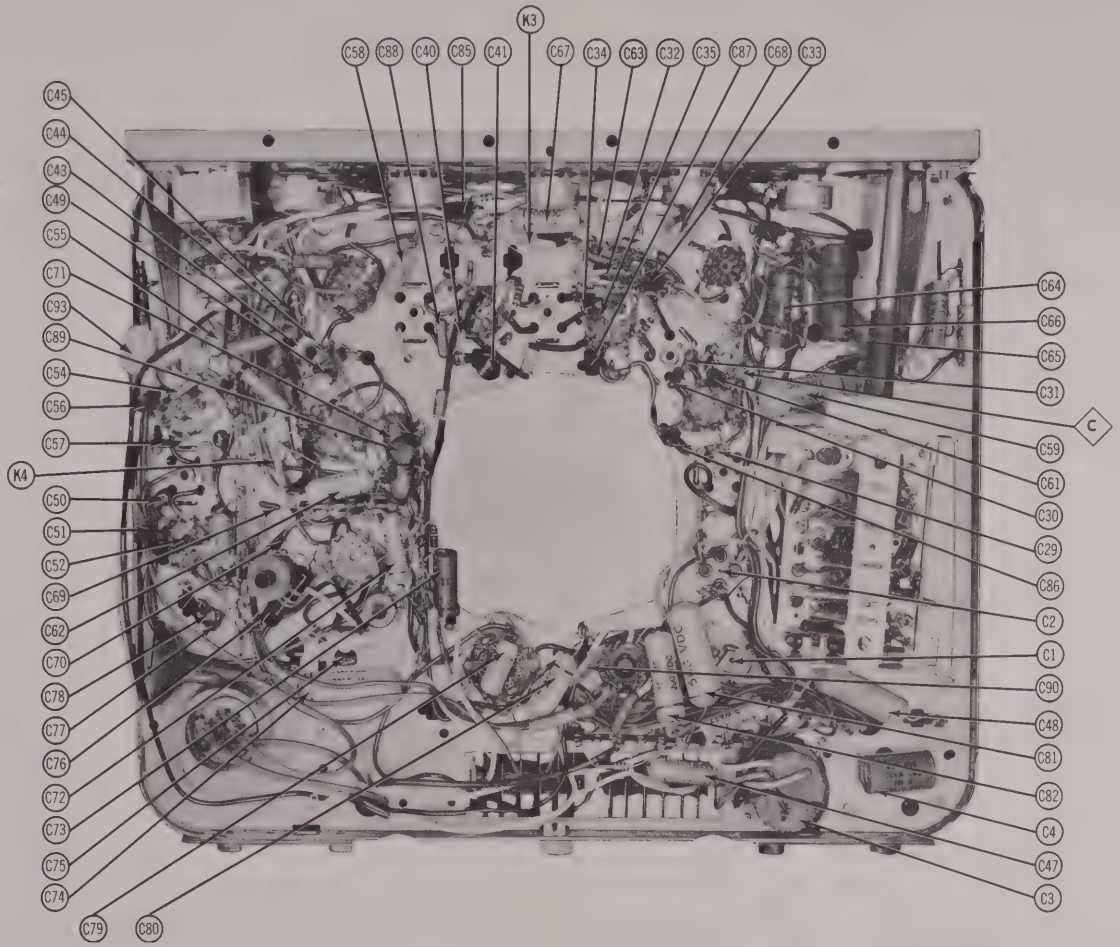
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, Diode (M3), V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V15**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V6, V7, V10**
No horiz. sync - **V6, V7, V11**
No vert. or horiz. sync - **V6, V7**

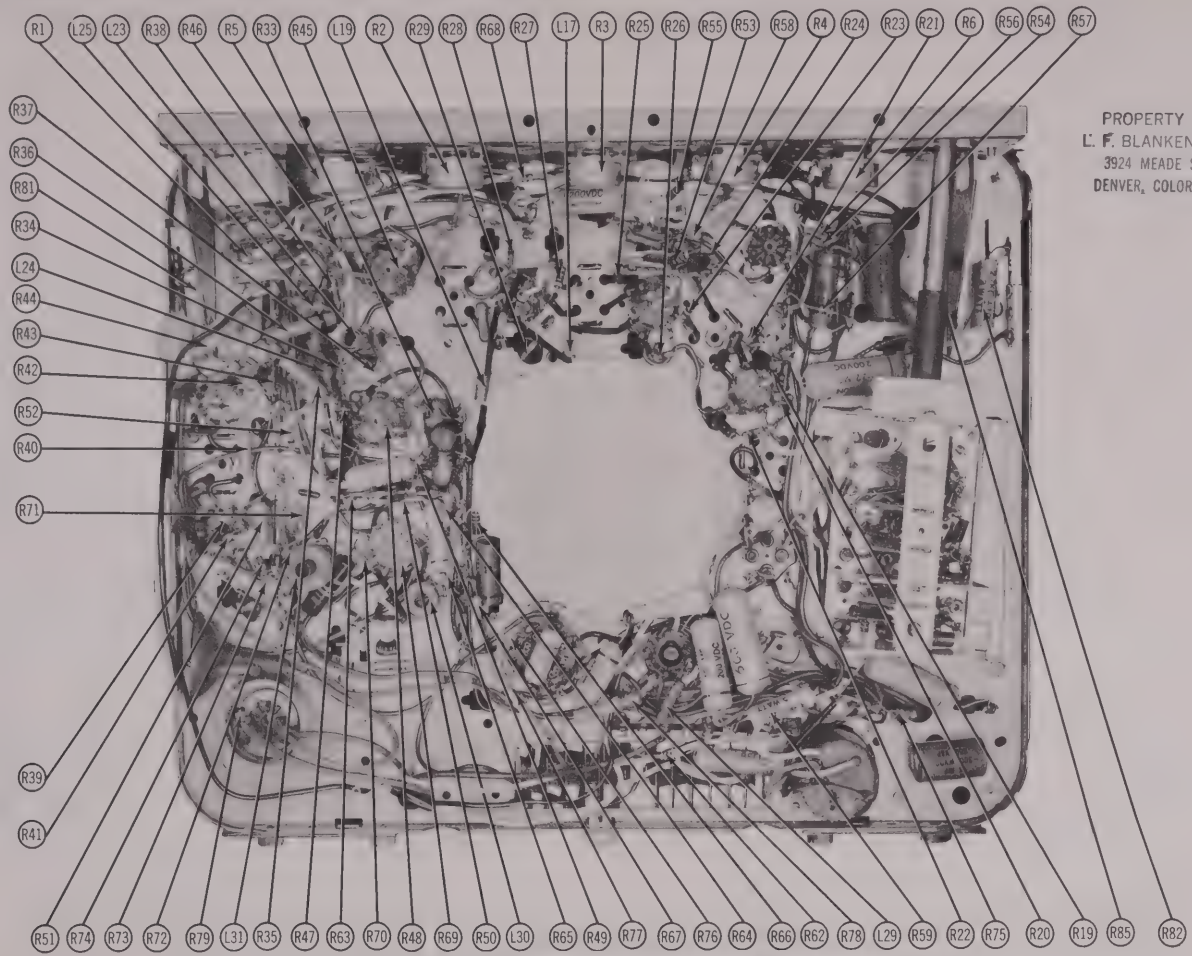
SWEEP FAILURE
No raster, has sound - **V11, V12, V13, V14, V15**
No vertical deflection - **V10**
Poor vert. linearity or foldover - **V10**
Poor horiz. linearity or foldover - **V11, V12, V13**
Narrow picture - **V11, V12, V13, M1, M2**
Vert. off freq. - **V6, V7, V10**
Horiz. off freq. - **V6, V7, V11**

Since this receiver employs tubes used in a series filament network, an open filament on any of the tubes in the series will cause the set to be inoperative. (See circuit diagram below)





CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Connect a 1000MMF capacitor across the input terminals of the scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	1000MMF	High side to pin 1 (grid) of 3CB6 (V3). Low side to chassis.	Not used.	44.4MC (unmod)	4	USE VTVM DC probe thru 10K to point Ⓐ. Low side to chassis.	A1	Use only enough generator output to provide usable indication on VTVM. Adjust for maximum deflection.
2.	"	"	"	48.22MC	"	"	A2	Adjust for MINIMUM deflection.
3.	"	"	"	45.4MC	"	"	A3	Use only enough generator output to provide usable indication on VTVM. Adjust for maximum deflection. Repeat step 2.
4.	"	"	"	43.3MC	"	"	A4	Use only enough generator output to provide usable indication on VTVM. Adjust for maximum deflection.
5.	"	"	44.0MC (10MC Swp)	42.65MC 46.75MC	"	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.		Use only enough sweep generator output to provide usable pattern on scope. Check for response similar to Fig. 1. If necessary, retouch A1, A3 and A4 for desired response. Adjust A1 for MINIMUM tilt. A3 affects high frequency side of curve and A4 affects the low frequency side.
6.	Direct	High side to a narrow strip of insulated metal placed between converter tube and tube shield. Low side to chassis.	Not used.	41.25MC	"	USE VTVM DC probe thru 10K to point Ⓐ. Low side to chassis.	A5	Use only enough generator output to provide usable indication on VTVM. Adjust for MINIMUM deflection.
7.	"	"	44.0MC (10MC Swp)	42.65MC 46.75MC	"	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.	A6, A7	Adjust for response similar to Fig. 1. If necessary, SLIGHTLY retouch A1, A3 and A4 for desired response.

SOUND IF ALIGNMENT

Tune in a TV station and adjust the fine tuning control until sound bars just appear in the picture. Adjust A8 slug counter clockwise from the coil turns; then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning for the clearest picture and best sound.
Reduce the signal strength at the antenna terminals by using an attenuator or similar device until a hiss similar to super regenerator is heard in the sound. Adjust A1, A10, A11 and the buzz control (R7) for maximum sound and MINIMUM buzz. If the hiss disappears during these adjustments, further reduce the signal until the hiss returns.

VIDEO TRAP COIL ADJUSTMENT

Turn the set on and tune in a TV station. Adjust the fine tuning until sound bars just appear in the picture. Turn A12 fully counter clockwise and then clockwise until the horizontal scanning lines are smooth and continuous.

RF AND MIXER ALIGNMENT

Connect the negative lead of a 1.5 volt bias battery to point Ⓒ. Positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point Ⓑ. Low side to chassis.	A13, A14	Adjust for maximum amplitude with markers as indicated in Fig. 2.
9.	"	"	177MC (10MC Swp)	175.25MC 179.75MC	7	"		Check for response similar to Fig. 2. If necessary, make compromise adjustment of A13 and A14.
10.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A15, A16	Adjust by compressing or expanding coil turns to obtain response similar to Fig. 2.
11.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"		Check for response similar to Fig. 2. If necessary, make compromise adjustment of A15 and A16.

OSCILLATOR ALIGNMENT

Connect bias as under "RF and Mixer Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range by setting the flat side of the shaft parallel with the chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC	13	Vert. amp. thru 10K to point Ⓐ. Low side to chassis.	A17	Adjust for response as shown in Fig. 3 with marker at 50%.
13.	"	"	85MC (10MC Swp)	83.25MC	6	"	A18	"

IF INTERFERENCE ADJUSTMENT

Adjust A19 for MINIMUM IF interference in the picture if any is present.

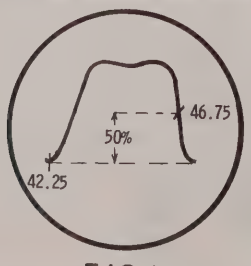


FIG. 1

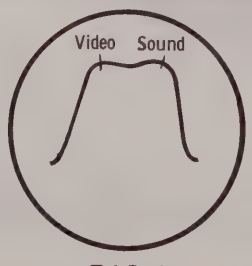


FIG. 2

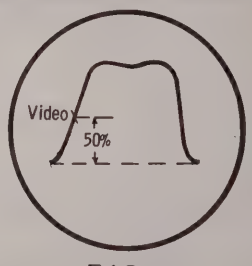
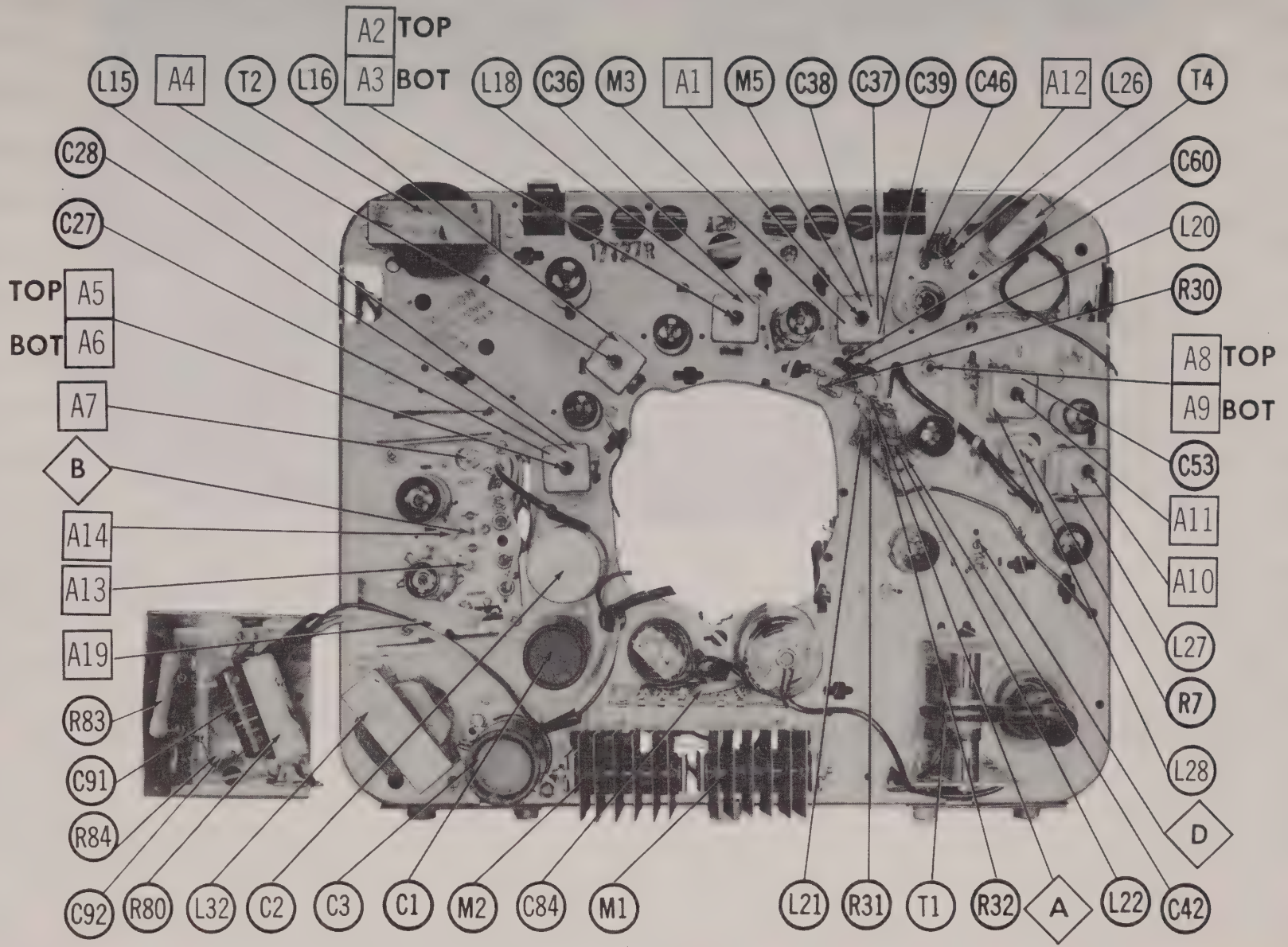


FIG. 3



CHASSIS TOP VIEW

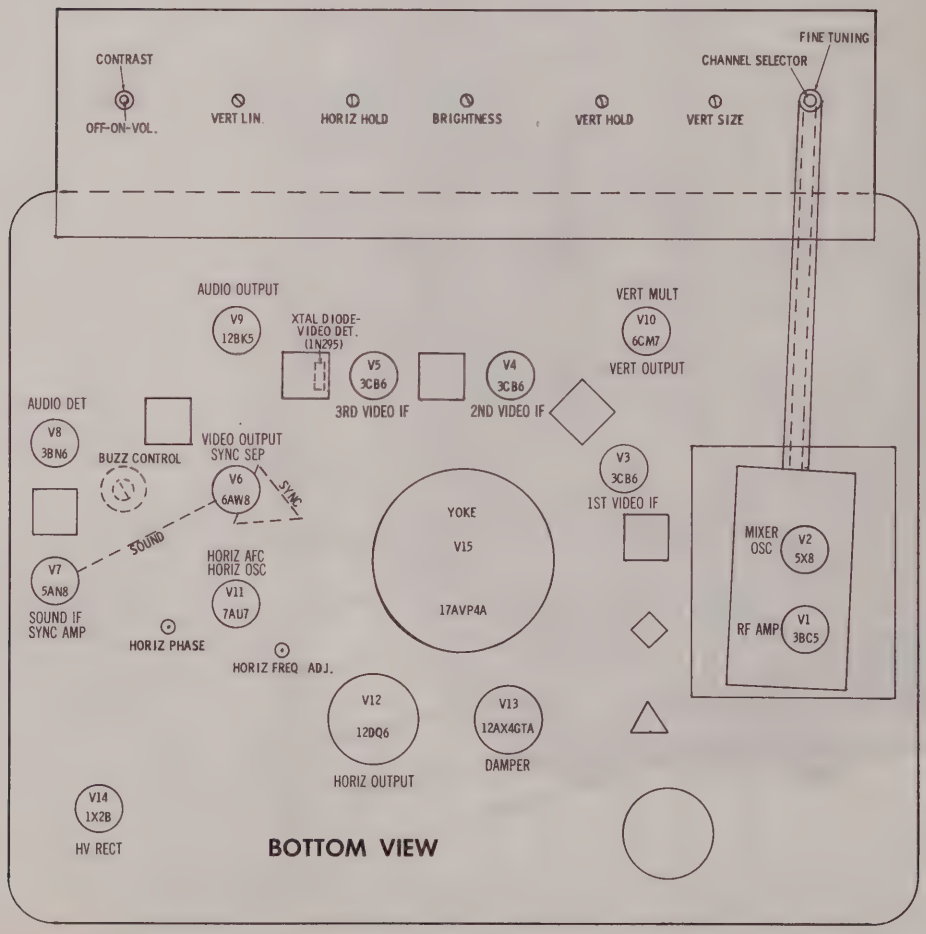
2D2720A, B

TRUETONE MODELS

RESISTANCE MEASUREMENTS

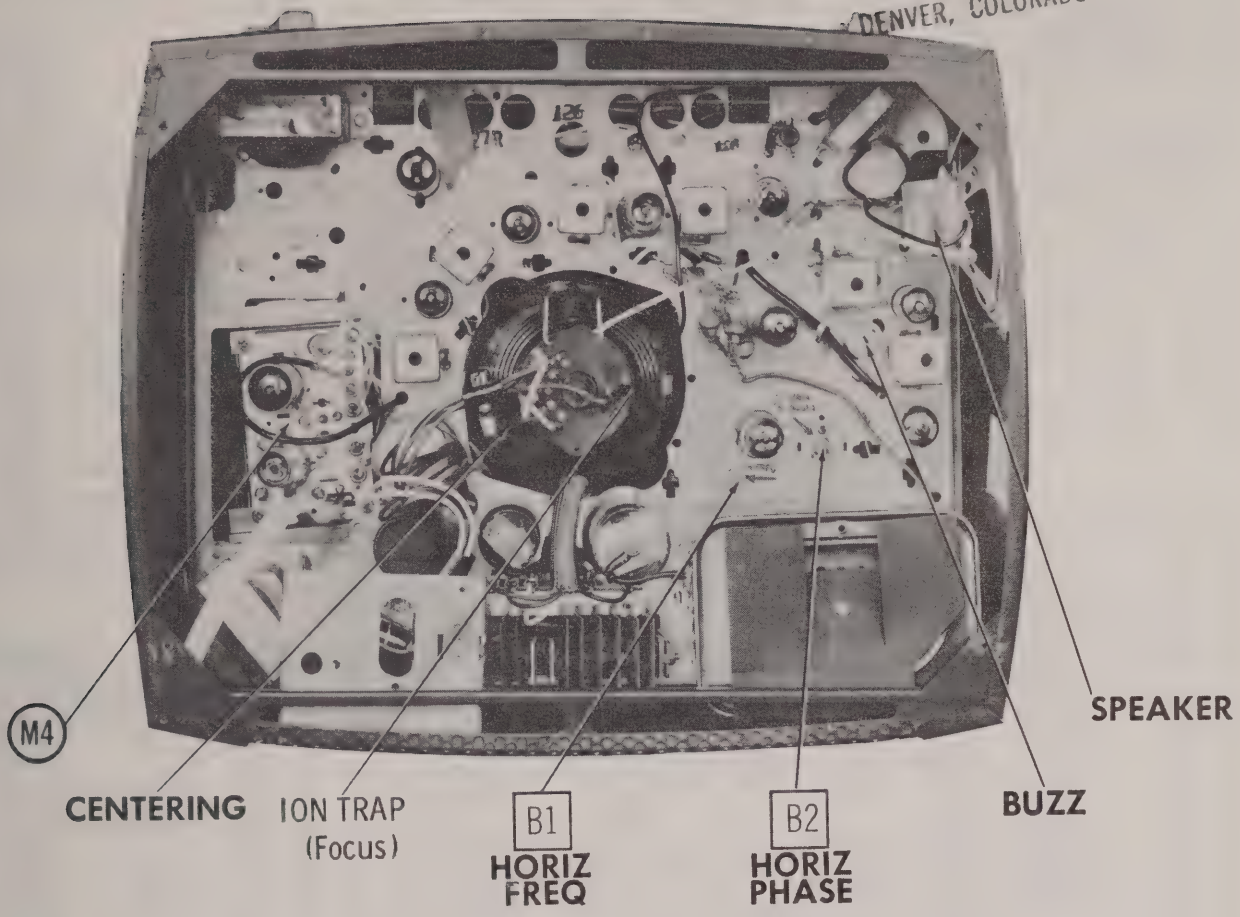
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BC5	1Meg	0Ω	12Ω	11Ω	†2800Ω	†6000Ω	0Ω		
V2	5X8	0Ω	10K	†12K	11Ω	10Ω	0Ω	220K	†5000Ω	†2800Ω
V3	3CB6	1Meg	47Ω	10Ω	9Ω	†3700Ω	†3700Ω	0Ω		
V4	3CB6	1Meg	47Ω	9Ω	8Ω	†3700Ω	†3700Ω	0Ω		
V5	3CB6	.1Ω	150Ω	8Ω	7Ω	†2800Ω	†2800Ω	150Ω		
V6	6AW8	0Ω	2.2Meg	†2.2Meg	5Ω	3.5Ω	•120Ω	1Meg	†1800Ω	†4000Ω
V7	5AN8	†7500Ω	22K	0Ω	6Ω	7Ω	†33K	†33K	470K	47Ω
V8	3BN6	•320Ω	.3Ω	0Ω	1.5Ω	†18K	4.8Ω	†220K		
V9	12BK5	†420Ω	TP	22K	16Ω	14Ω	150Ω	22K	†42Ω	NC
V10	6CM7	‡3300Ω	NC	•150K	14Ω	12Ω	•‡4Meg	47K	2.2Meg	•1000Ω
V11	7AU7	†45K	370K	0Ω	5Ω	5Ω	•†30K	1.4Meg	290K	6Ω
V12	12DQ6	TP	18Ω	TP	†15K	470K	TP	16Ω	0Ω	TOP CAP ‡9Ω
V13	12AX4GTA	TP	NC	180K	NC	†42Ω	TP	18Ω	21Ω	
V14	1X2B	PINS 1 THRU 9 HAVE INFINITE RESISTANCE								TOP CAP ‡279Ω
V15	17AVP4A	3.5Ω	33K	Pin 6 †42Ω	Pin 10 †42Ω	Pin 11 •120K	Pin 12 1.5Ω			

† MEASURED FROM OUTPUT OF M2.
‡ MEASURED FROM PIN 3 OF V13.
• THIS READING WILL VARY, CONTROL SET FOR NORMAL OPERATION.
NC NO CONNECTION
TP TIE POINT



TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Turn the horizontal hold control to its mid-range position.

Connect a short clip lead across the horizontal phase coil (L31) and adjust the horizontal frequency slug (B1) until the picture synchronizes horiaontally.

Remove the clip lead, and connect the vertical amplifier of the scope to point (D). Low side to chassis.

Adjust the horizontal phase slug (B2) until equal peaks are obtained on the waveform as shown in Fig. 4.

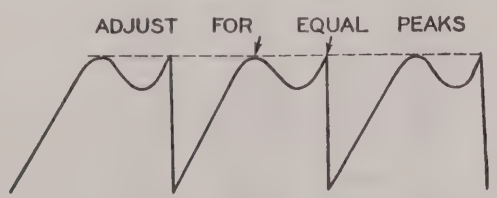


FIG. 4

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amp.	3BC5	
V2	Mixer-Osc	5X8	
V3	1st Video IF Amplifier	3CB6	
V4	2nd Video IF Amplifier	3CB6	
V5	3rd Video IF Amplifier	3CB6	
V6	Video Output-Sync Sep.	6AW8	
V7	Sound-IF Amp.-Sync Amp.	5AN8	
V8	Audio Det.	3BN6	
V9	Audio Output	12BK5	
V10	Vert Mult. Vert. Output	6CM7	
V11	Horiz. AFC-Horiz Osc.	7AU7	
V12	Horiz. Output	12DQ6	
V13	Damper	12AX4GTA	
V14	HV Rectifier	1X2B	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	TRUETONE PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V15	17AVP4	17AVP4	17AVP4	17AVP4	1. Aluminized
	17AVP4A	17AVP4A ①	17AVP4A ②	17AVP4A ③	2. Silver Screen '85'

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	TRUETONE PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	150	150	8C-22484	AFH31-23	AA0281	FP117	TM8-25	T-050	TVL-1429
C2	150	300	8C-27112	AFH31-37-25	DA270	FP131	TM3-42	S-200	TVL-1564
C3A	100	300	8C-28309	AFH4-108-80	DU788	WQ835	TMQ-155	T-4537-1 MTD-4530	TVL-4703.5
B	10	300							
C	25	450							
D	50	50							
C4	5	300	8C-24174	PRS350V4	MR435	TC80	TD-5-350	FM-3508	TVA-1801

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	27		RC6-9008	MPG-81 37	TCE-27	CG27C	TCG-37			
C6	18		RC6-9009	MPG-81 18	TCE-18	CG18C	TCG-18			
C7	5-20		RC6-8008							
C8	10		RC6-8010	MPG-81 10	TCE-10	CG10C	TCG-10	ET-541	5TCC-Q1	
C9	1000		RC6-9040	KT-001	MFT-1000				503C-D1	
C10	3-3		RC6-8027		839-3		3115-D		CT-563A	
C11	1000		RC6-9007	BPD-001	DD-102	BYA5D1	ED-1000	DC521	5HK-D1	
C12	1000		RC6-9009	BPD-001	DD-102	BYA5D1	ED-1000	DC521	5HK-D1	
C13	1000		RC6-9009	BPD-001	DD-103	BYA5D1	ED-1000	DC521	5HK-D1	
C14	33		RC6-8008	MPG-81 33	TCE-33	CG33C	TCG-33	ET-3433	5TCC-Q33	
C15	3		RC6-8004	MPG-81 1	TCE-3.3	CG3V3C	TCG-3.3		5TCC-B-V1	
C16	3-3		RC6-8027		839-3		3115-D		CT-563A	
C17	1-5		RC6-8003	MPG-81 L 5	TCE-1.5	CG1V5C	TCG-1.5	ET-5015	5TCC-B-V15	
C18	47		RC6-9025	MPG-81 47	TCE-47	CG4Q7C	TCG-47		5TCC-Q47	
C19	1000		RC6-9059	BPD-001	DD-103	BYA5D1	ED-1000	DC521	5HK-D1	
C20	1000		RC6-9040	KT-001	MFT-1000				503C-D1	
C21	15		RC6-9006							
C22	4									
C23	1000		RC6-9040	KT-001	MFT-1000				503C-D1	
C24	1000		RC6-9059	BPD-001	DD-103	BYA5D1	ED-1000	DC521	5HK-D1	
C25	1000		RC6-9059	BPD-001	DD-103	BYA5D1	ED-1000	DC521	5HK-D1	
C26	1000		RC6-9040	KT-001	MFT-1000				503C-D1	
C27	100			MPG-81 100	TCE-100	CG1C1U	TCC-100	NT-531	5TCC-U1	
C28	27			1467-00007		SW8Q27			MS-427	
C29	3.3			MPG-81 3.3	TCE-3R3	CG3V3C	TCC-3.3		5TCC-B-V32	Note 1
C30	10			NT50-81 10	TCE-10	CG1Q1U	TCT-37	NT-541	5TCC-Q2	
C31	1000			BPD-00068	DD-581	BYA1DT58	ED-580	UC-5586	SGA-T68	
C32	5000			BPD-008	DD-503	BYA5D6	GP-5000	DC525	5HK-D5	
C33	1000			BPD-001	DD-103	BYA5D1	ED-1000	DC521	5HK-D1	
C34	10			NT50-81 10	TCE-10	CG1Q1U	TCT-37	NT-541	5TCC-Q2	
C35	580			BPD-00068	DD-581	BYA1DT68	ED-680	UC-5586	SGA-T68	
C36	27			1467-00037		SR8Q27			MS-427	
C37	15			NT50-81 15	TCE-15	CG1Q5U	TCT-15		5TCC-Q25	
C38	33			NT50-81 33	TCE-33	CG1Q33U	TCT-33		5TCC-Q22	
C39	5			NP2-81 5	TCE-5	CG1C5C	TCC-5	ET-555		
C40	330			BPD-00033	DD-371	LU0Z33	ED-330	UC-5322	SGA-T22	
C41	5000			BPD-008	DD-503	BYA5D6	GP-5000	DC525	5HK-D5	
C42	.1	200		P388H-1	DF-104	CU38P1		GEM-302	2TM-P1	
C43	51									
C44	2.2			MPG-81 2.2	TCE-2.2	CG2V2C	TCC-2.2		5TCC-B-V22	Note 2
C45	.1	400		P488H-1	DF-104	CU38P1		GEM-402	4TM-P1	
C46	100			BPD-0001	DD-101	LU0T1	ED-100	UC-531	SGA-T1	
C47	033	600		BPD-03	DF-304	CU3S633		GEM-6133	6TM-S33	
C48	.068	600		P468H-068		CU3S668		GEM-6168	6TM-S68	
C49	33			MPG-81 33	TCE-33	CG1Q33C	TCC-33	ET-3433	5TCC-Q33	
C50	470			BPD-00047	DD-471	LU0AT47	ED-470	UC-5347	SGA-T47	
C51	10000			BPD-01	DD-103	BYA5D1	GP-10000	DC521	5HK-S1	
C52	1000			BPD-001	DD-103	BYA5D1	ED-1000	DC521	5HK-D1	
C53	10									
C54	1000			BPD-001	DD-103	BYA5D1	ED-1000	DC521	5HK-D1	
C55	.01	400		BPD-01	DD-103	CU3S4E		GEM-41	4TM-S1	
C56	10000			BPD-01	DD-103	BYA5E1	GP-10000	DC511	5HK-S1	
C57	10000			BPD-01	DD-103	BYA5E5	GP-10000	DC521	5HK-S1	
C58	.0047	600		BPD-0047	DE-475	CU3SD47		GEM-6247	6TM-D47	
C59	.22	200		P388H-22	DD-220	CU3SP22		GEM-2222	2TM-P22	
C60	5000			BPD-08	DD-503	BYA1OD6	GP-5000	DC525	5HK-D5	
C61				BPD-01	DD-103	BYA5D5	ED-1000	DC521	5HK-D1	
C62	.047	400		BPD-047	DD-473	CU3S4S7		GEM-4147	4TM-S47	
C63	3000			BPD-002	DD-302	BYA1OD2	GP-3000	DC522	5HK-D2	
C64	.033	400		BPD-03	DD-303	CU3S4S3		GEM-4133	4TM-S33	
C65	.1	200		P388H-1	DF-104	CU3SP1		GEM-201	2TM-P1	
C66	.1	400		P488H-1	DF-104	CU3S4P1		GEM-401	4TM-P1	
C67	.1	400		P288H-1	DF-104	CU3SP1		GEM-201	2TM-P1	
C68	1000	2000	BC-24998	HVD-10-100	DD30-102	HVB2D1	HD5-1000	DC3D31	3GA-D1	
C69	47			BPD-00047	DD-470	LU0Q47	ED-47	UC-5447	SGA-Q47	Note 3
C70	82			BPD-000082	DD-820	LU0Q82	ED-82	UC-5482	SGA-Q82	
C71	.047	400		BPD-05	DF-503	CU3S4S7		GEM-4147	4TM-S47	
C72	.047	200		BPD-05	DF-503	CU3S2S47		GEM-2147	2TM-S47	
C73	.022	200		BPD-02	DF-223	CU3S223		GEM-2122	2TM-S22	
C74	.47	300		P298H-47	DD-470	CU3SP47		GEM-2047	2TM-P47	
C75	470			BPD-00047	DD-471	LU0T47		UC-5327	SGA-T27	
C76	.01	600		BPD-01	DF-103	CU3S6S1		GEM-61	6TM-S1	
C77	1000			BPD-001	DD-102	BYA5D1	ED-1000	DC521	5HK-D1	
C78	82	500		BPD-000082	DD-820	LU0Q83	ED-82	UC-5482	SGA-Q82	
C79	.001	600		BPD-001	DD-102	CU3SD1		GEM-62	6TM-D1	
C80	.047	400		BPD-05	DF-503	CU3S4S47		GEM-4147	4TM-S47	
C81	.1	600		P468H-1	DF-104	CU3SP1		GEM-601	6TM-P1	
C82	.15	200		P288H-15		CU3SP15		GEM-2015	2TM-P15	

CAPACITORS (cont)

ITEM No	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	
C83	56	2000							Note 4
C84	120	5000	8G-25325						
C85	5000			BPD-005	DD-502	BYA1OD5	GP-5000	DC525	5HK-D5
C86	1000			BPD-001	DD-102	BYA5D1	ED-1000	DC521	5HK-D1
C87	1000			BPD-001	DD-103	BYA5D1	ED-1000	DC521	5HK-D1
C88	1000			BPD-001	DD-422	BYA5D1	ED-1000	DC521	5HK-D1
C89	5000			BPD-005	DD-503	BYA1OD5	GP-5000	DC525	5HK-D5
C90A	5000			BPD-2X5047	DD2-502	BYD5D5	GP-5000	DC525	5HK-2D47
B	5000						GP-5000	DC525	
C91	28	400		P488H-22		CU34P22		GEM-4022	4TM-P22
C92	5000	1500	8G-22812	HVD-15-4700		HVC15D47	HD15-4700	G.M.-1525	15TM-D5
C93	5000	1500	8G-22812	HVD-15-4700		HVC15D47	HD15-4700	G.M.-1525	15TM-D5

Note 1: Not used in some versions.
Note 2: Some versions may use a 3.3MMF in this application.
Note 3: Some versions may use an 82MMF in this application.
Note 4: Some versions may use a 47MMF in this application.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST ANCE	WATTS	TRUETONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1000Ω	½	10A-33714	F1-4	RTY-4G8		UF15L	Contrast
B	1Meg	½		R3-S3	Not Req.		UR16A	Volume
C	#switch			K3-1	Not Req.		UR-2S6	
R2A	50K	½	10B-23604	A3-S1	A47-50K-S	Q11-1S3	TA94L	Horiz. Hold
B	Shaft			AK-4	K8S-5	Not Req.	Not Req.	
R3A	500K	½	10B-23605	A3-S6	A47-500K-S	Q11-1S3	TA85L	Brightness
B	Shaft			AK-4	K8S-5	Not Req.	Not Req.	
R4A	100K	½	10B-23603-1	A3-S3	A47-100K-S	Q11-S8	TA84L	Vert. Hold
B	Shaft			AK-4	K8S-5	Not Req.	Not Req.	
R5A	25000Ω	½	10B-37188	A3-7	A47-2500-S	Q11-2S	PTA25L	Vert. Lin.
B	Shaft			AK-19	TQ	Not Req.	Not Req.	
R6A	45Meg	½	10B-37186	A3-89	A47-7.5Meg-S	Q11-1S3	PTA75L	Vert. Size
B	Shaft			AK-19	TQ	Not Req.	Not Req.	
R7	750Ω	2	10D-23867			39-750		Buss (Wire-wound)

* Concentrik Equivalent, Kit K-6, Base Elements & Shafts, R1T-106, P1T-105 (Panel)
R3-157, R3-158 (Rear)
76-1 Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R8	10K			BTS-10K	
R9	330Ω			BTS-330	
R10	330Ω			BTS-3300	
R11	4700Ω			BTS-4700	
R12	3300Ω			BTS-2200	
R13	330K			BTS-330K	
R14	1000Ω			BTS-1000	
R15	1000Ω			BTS-1000	
R16	3300Ω			BTS-3300	
R17	10K			BTS-10K	
R18	10K			BTS-10K	
R19	1000Ω			BTS-1000	
R20	10000Ω			BTS-10000	
R21	1000Ω			BTS-1000	
R22	47Ω			BTS-47	
R23	47K			BTS-47K	
R24	1000Ω			BTS-1000	
R25	1000Ω			BTS-1000	
R26	47Ω			BTS-47	
R27	47K			BTS-47K	
R28	1000Ω			BTS-1000	
R29	100Ω			BTS-150	
R30	2Meg			BTS-2Meg	
R31	3900Ω			BTS-3900	
R32	8200Ω			BTS-8200	
R33	1Meg			BTS-1Meg	
R34	33K			BTS-33K	
R35	20000Ω 5%	2		BTS-3200 5%	
R36	20000Ω 5%	2		BTS-3200 5%	
R37	82Ω			BTS-83	
R38	100K			BTS-100K	
R39	470K			BTS-470K	
R40	33K	1		BTA-33K	
R41	47Ω			BTS-47	
R42	680Ω			BTS-680	
R43	220K			BTS-220K	
R44	18K	2		BTS-18K	
R45	22K	1		BTA-22K	
R46	150Ω	1		BTA-150	

ITEM No	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R47	10K			BTS-10K	Note 1
R48	2.2Meg			BTS-2.2Meg	
R49	1Meg			BTS-1Meg	
R50	22K			BTS-22K	
R51	4700Ω	1		BTA-4700	
R52	1000Ω			BTS-1000	
R53	47K			BTS-47K	
R54	8200Ω			BTS-8200	
R55	750 5%			BTS-750 5%	
R56	2.2Meg			BTS-2.2Meg	
R57	2.2Meg			BTS-2.2Meg	
R58	100K			BTS-100K	
R59	3300Ω	5	9C1S-1105	PWF-3300	
R60	330Ω				Note 2
R61	330Ω				Note 2
R62	33K			BTS-33K	
R63	330K			BTS-330K	
R64	820K			BTS-820K	
R65	220K			BTS-220K	
R66	68K 5%				
R67	3900Ω			BTS-3900	
R68	10K				Note 1
R69	150K 5%			BTS-150K 5%	
R70	8200Ω			BTS-8200	
R71	18K			BTS-18K	
R72	39K	1		BTA-39K	
R73	82K			BTS-82K	
R74	68K			BTS-68K	
R75	4700Ω			BTS-4700	
R76	470K			BTS-470K	
R77	150Ω			BTS-150	
R78	15K	3		BTS-15K	
R79	2.7Ω		9C1-1068	BW1-2.7	
R80	50Ω	30	9C-27577	RD-50	
R81	1800Ω	5	9C1S-1102		
R82	2700Ω	5	9C1J-1104		
R83	9.1Ω	5	46M-23018		
R84	820K			BTS-820K	
R85	330K			BTS-330K	

Note 1: A 22K resistor is used in some versions.
Note 2: A 150Ω resistor is used in some versions.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA							
		TRUETONE PART No.	Hallodenson PART No.	Merit PART No.	RCA TYPE No.	Rom PART No.	Stencor PART No	Thordenson PART No	Triad PART No
T1	Horiz. Output Trans.	12K-27149	FB448*	HVB-58*	2047Y③⑫	X126*	HO-250*	J LY-98*	D-83*
T2	Vert. Output Trans.	12K-27189	21803 ①	A-3038①	V309 ①	V309 ①	A-812 ①	26851 ①	A-103X
T3A	Yoke(90°Horiz.&SAME)	12H-23593 ③	DF677③	MDF-02	23SD1③	Y92F3A/G3	DY-18A ①	Y-10 ②③	T-41 & TC
B	Vert(35MH)	98M-23770 ③	③ 10		③ 10	③⑫ 10	③ 10	10	③ 10
		2D-23654 ③							
		90S-23523 ③							

① Connect as auto. transformer.
② Drill new mounting hole(s).
③ Includes resistance R80, R81 and capacitor C83.
④ Yoke rear cover and centering device.
⑤ Yoke shield.
⑥ Ground lead assembly.
⑦ Use original rear cover and centering device.
⑧ Loosen and rotate core clamp to duplicate original shield mounting.
⑨ Connect horiz. network across yoke terms #3 and #7.
10 Use original yoke damping network, if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Hallodnson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rom Replacement Connections	Stencor Replacement Connections	Thordenson Replacement Connections	Triad Replacement Connections
	6	6	8	8	8	8	8	8
	2	3	6	6	3	2	2	3
	1	2	2	2	2	1	1	2
Special Purpose Use		11						11

11 Connect approx. 50-100MMF @ 4KV capacitor across horiz. yoke terms #3 and #7.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	TRUETONE PART No.	Hallodenson PART No.	Merit PART No.	Stencor PART No.	Thordenson PART No.	Triad PART No.	
T4	6400Ω	3-4Ω	12C-23704	21H3	A-3026	A-3078	24800	S-7X	

SPEAKER

ITEM No	TYPE				REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.		TRUETONE PART No.	QUAM PART No	
SP1	4	PM	3-4Ω		18A-23634-1	4A07	

COILS (RF-IF)

ITEM No.	USE	TRUETONE PART No.	NOTES
L1	Ant. Coil	RC3-6167	
L2	41MC Trap	RC3-6206	
L3	Ant. Coil	RC3-6230	
L4	Fil. Choke	RC3-6206	
L5	Ant. Coils	RC1-35797	Channel 2 thru 13
L6	Ant. Coil	RC3-6207	Channel 13
L7	RF Coils	RC1-35781	Channel 3 thru 13

ITEM No.	USE	TRUETONE PART No.	NOTES
L8	RF Coil	RC3-6106	Channel 13
L9	Mixer Grid Coils	RC1-35818	Channel 3 thru 13
L10	Mixer Grid Coil	RC3-6230	Channel 13
L11	Conv. Plate Coil	RC3-6234	
L12	Osc. Coils	RC1-35797	Channel 3 thru 13
L13	Osc. Coil	RC3-6209	Channel 13
L14	Osc., Coil	RC3-6218	Channel 13

ITEM No.	USE	REPLACEMENT DATA				NOTES
		TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L15A	1st Video IF	18A-34303				
B	41.25MC Trap					
L16	2nd Video IF	18A-34324				
L17	Fil. Choke	18A-35688	19-1001		4804	1.5 Microhenries
L18A	3rd Video IF	18A-34937				
B	47.25MC Trap					
L19	Fil. Choke	18A-35688	19-1001		4804	1.5 Microhenries
L20	Series Peaking Coil	18A-36988				7.5 Microhenries, 68MC
L21	Shunt Peaking Coil	18A-37203	19-3380	TV-188	6181	180 Microhenries
L23	Series Peaking Coil	18A-37203			6136	440 Microhenries
L23A	4.5MC Trap	201-23729				
B	1st Sound IF					
L24	Series Peaking Coil	18A-37486	19-3075		6178	80 Microhenries
L25	Shunt Peaking Coil	18A-37204	19-4400		6136	400 Microhenries
L26	6.5MC Trap	18A-25441				
L27	2nd Sound IF	201-23729				
L28	Quadrature Coil	201-23797	20-1006		1480	
L29	RF Choke	18A-31721				8 Microhenries

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rom PART No.	Thordenson PART No	
L30	90Ω		201-34472			6212			HS-7	Tapped @ 58Ω for Horiz. Freq.
L31	25Ω		201-34473-3			6314			HS-8	Horiz. Phase

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (1) CURRENT 100MA	TRUETONE PART No.	Hallodenson PART No.	Merit PART No.	Stancor PART No.	Thordenson PART No.	Triad PART No.
L32	.250A	42Ω	L 5HY	16H-35168-3	C5037 ①	C-3296 ①	C-3291 ①	26C44 ①	C-17X ①

① Drill one new mounting hole.

COMPONENT COMBINATIONS

USE	DESCRIPTION	TRUETONE PART No.	REPLACEMENT DATA	
K1	Ant. Coupler	470MMF, .3-1Meg	RC6-70005	
K2	Ant. Coupler	470MMF, .3-1Meg	RC6-70005	
K3	Vertical Integrator	2000MMF, 5000MMF, 5000MMF, 22K, 82000Ω, 220MΩ	17A-23216	
K4	Sync Coupler	270MMF, 10000MMF, 25MMF, 270K, 2.2Meg	17A-24213	

Aerovox		PA-110
Centralab		PC-100
Erie		1402-01
Aerovox		PA-533
Centralab		PC-263
Sprague		9T-3

TRUETONE MODELS 2D2720A, B

PARTS LIST AND DESCRIPTIONS (Continued)

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA						
	CURRENT (Measured)	TRUETONE PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.
M1	. 250A	21J-25315 ①	1241A ①	1N1007 ②	MR350 ①	6S450 ①	6QA2 ①	350A ①
M2	. 250A	21J-25315 ①	1241A ①	1N1007 ②	MR350 ①	6S450 ①	6QA2 ①	350A ①

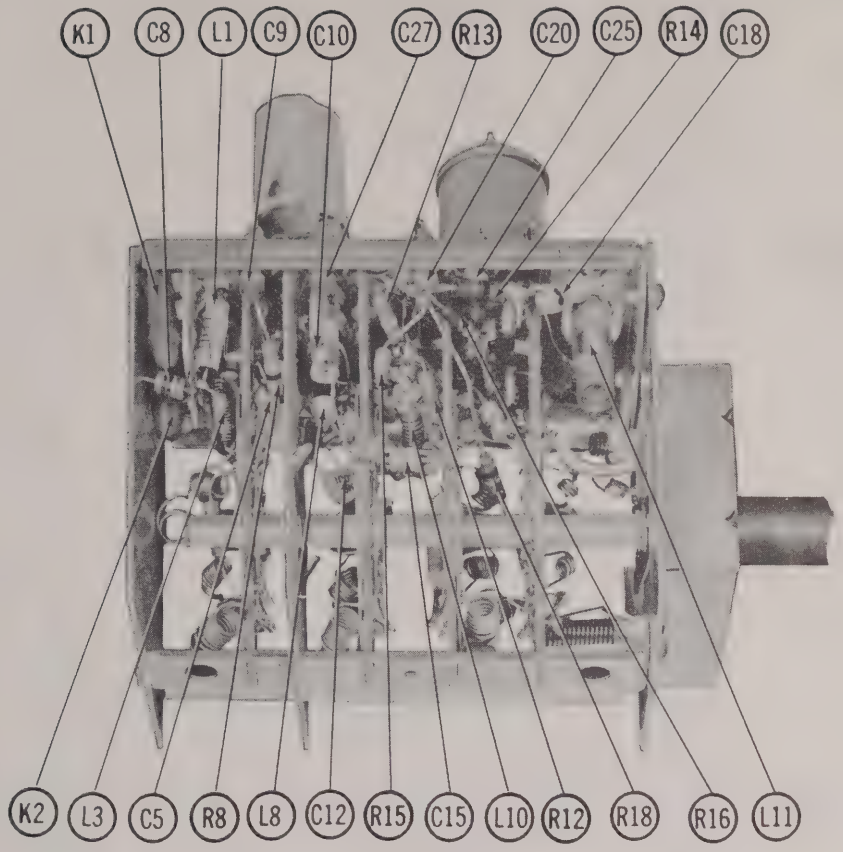
① Selenium type.
② Germanium type.

CRYSTAL DIODES

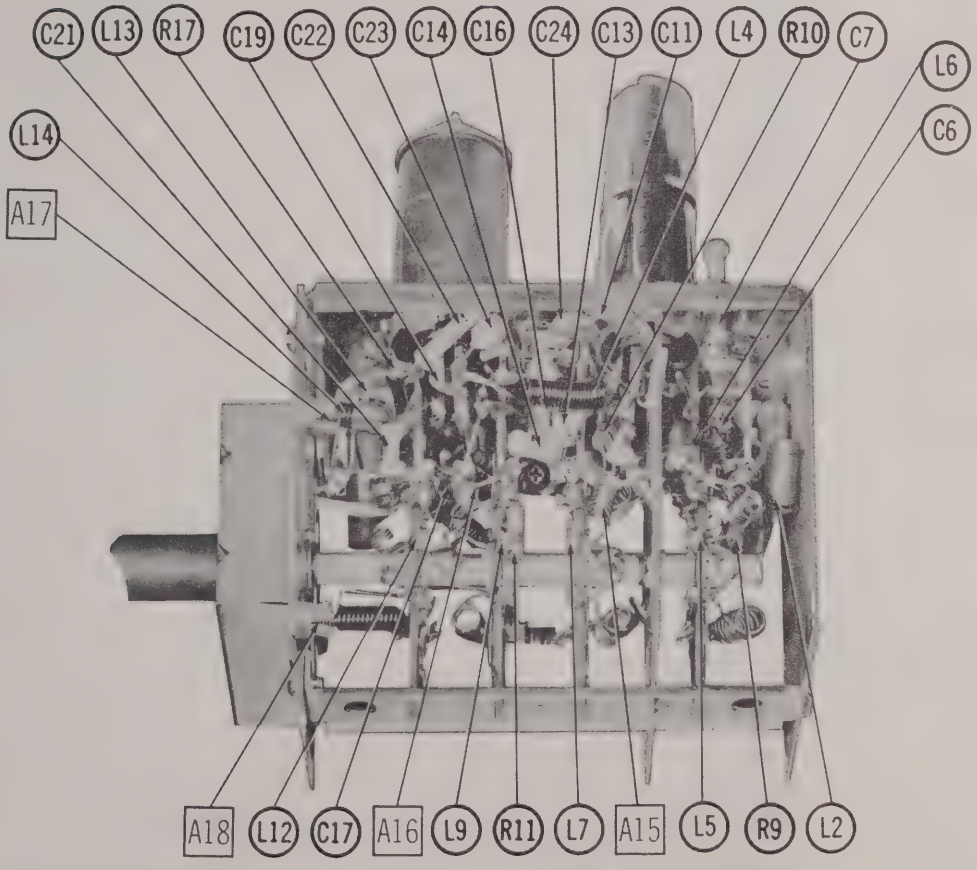
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		TRUETONE PART No.	SYLVANIA PART No.	
M3	1N295		1N60	Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M4	Tuner	211-27257	VHF
M5	Video Det. Ass'y.	13B-27003-1	Includes 4th Video IF, Caps., RF Choke, M3, Series Peaking Coils.
M6	Centering Device	16M-23770	
M7	Ion Trap	16M-19705	
M8	Correction Magnet		Anti-Pin Cushion (2 used)
	Yoke Clamp	49A-27154	
	Safety Glass	30M-18773	
	Handle	23A-27143	
	Handle Post	23A-27141	
	Knob	5B-27314-A221	Channel Selector
	Knob	5B-27315-A221	On-Off-Volume
	Knob	5B-27287-A221	Vertical Hold
	Knob	5B-27288-A221	Horizontal Hold
	Knob	5B-27289-A221	Brightness
	Knob	5B-27311-A29	Fine Tuning
	Knob	5B-27310-A29	Contrast
	Cabinet	200-27306	



RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE

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WEBCOR
MODEL 2718

WEBCOR
MODEL 2718

GENERAL INFORMATION

The Webcor Model 2718 Tape Recorder is designed for twin-track, two speed operation. The operating speeds are either 3 3/4 or 7 1/2 inches per second. The Webcor is designed to record and playback two tracks of material on standard width recording tape, which doubles the recording and playing time with no loss of frequency response or quality. Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from the microphone.

The Webcor Model 2718 Tape Recorder has a Cathode Ray Recording Level Indicator. This "eye" shows proper sound level for recording. The Webcor also has a tape counter that permits you to find quickly any particular portion of your tape recording.

Webcor Model 2718 has two speeds, 7 1/2" and 3 3/4" per second. Using both tracks, the recording times are as follows:

Reel Size	3 3/4" Speed	7 1/2" Speed
5" (600 ft.)	1 hour	1/2 hour
7" (1200 ft.)	2 hours	1 hour

The Model 2718 Tape Recorder is designed to operate on 60 cycle, 105-120 volts, AC supply only.

Manufactured by:

Webcor
5610 Bloomingdale Ave.
Chicago 39, Illinois

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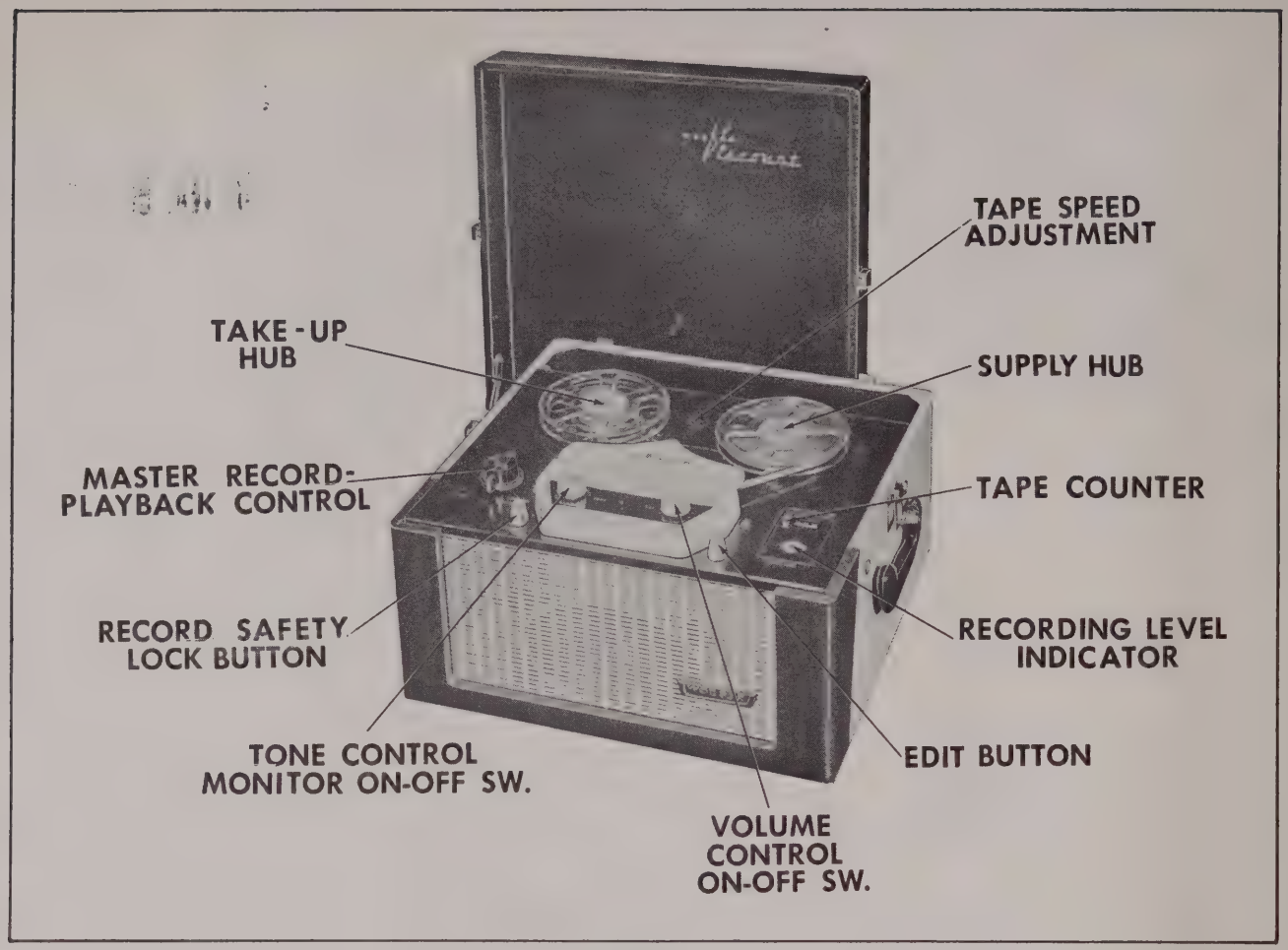

FIGURE 1

FUNCTIONS OF THE WEBCOR CONTROLS

Tape Counter —

This counter permits you to find quickly any particular portion of a recorded tape. Rotate the Reset Wheel toward the rear of the unit to set the dial at 000.

Cathode Ray Recording Level Indicator —

This "eye" shows proper sound level for recording.

Volume Control And On-Off Switch —

Turning this control clockwise turns unit "on". Further clockwise rotation increases the volume level for either record or playback position.

Tone Control And Monitor On-Off Switch —

Monitor "off" is at extreme counter-clockwise position. When in any other position Monitor is "on". This Monitor control permits listening to what is being recorded simultaneously as it is recorded.

Master Record-Playback Control —

This combines in one control the recording, playback, "Rewinding", and Fast Forward" feature, of this recorder. This Master Control must be used in conjunction with the Record Safety Lock Buttons when recording.

Tape Speed Adjustment —

This control permits you to adjust tape speed to either 3 3/4 inches per second or 7 1/2 inches per second. The Tape Speed Adjustment may be turned to either position with a small coin.

Edit Button —

The Edit Button allows "on the spot" editing of tapes. Tape may be stopped at any time when recording for editing.

OPERATING INSTRUCTIONS

Preparing Recorder For Operation —

1. Set tape speed adjustment to 3 3/4 or 7 1/2 inches per second. Webcor recording heads are designed for dual track recording — half of tape a 1/8" width is recorded first. When the reel is turned over the remaining 1/8" width is recorded. When using both tracks, a 5" reel will play 1 hour at 3 3/4 inches per second or 1/2 hour at 7 1/2 inches per second. A 7" reel plays 2 hours at 3 3/4 inches per second or 1 hour at 7 1/2 inches per second.

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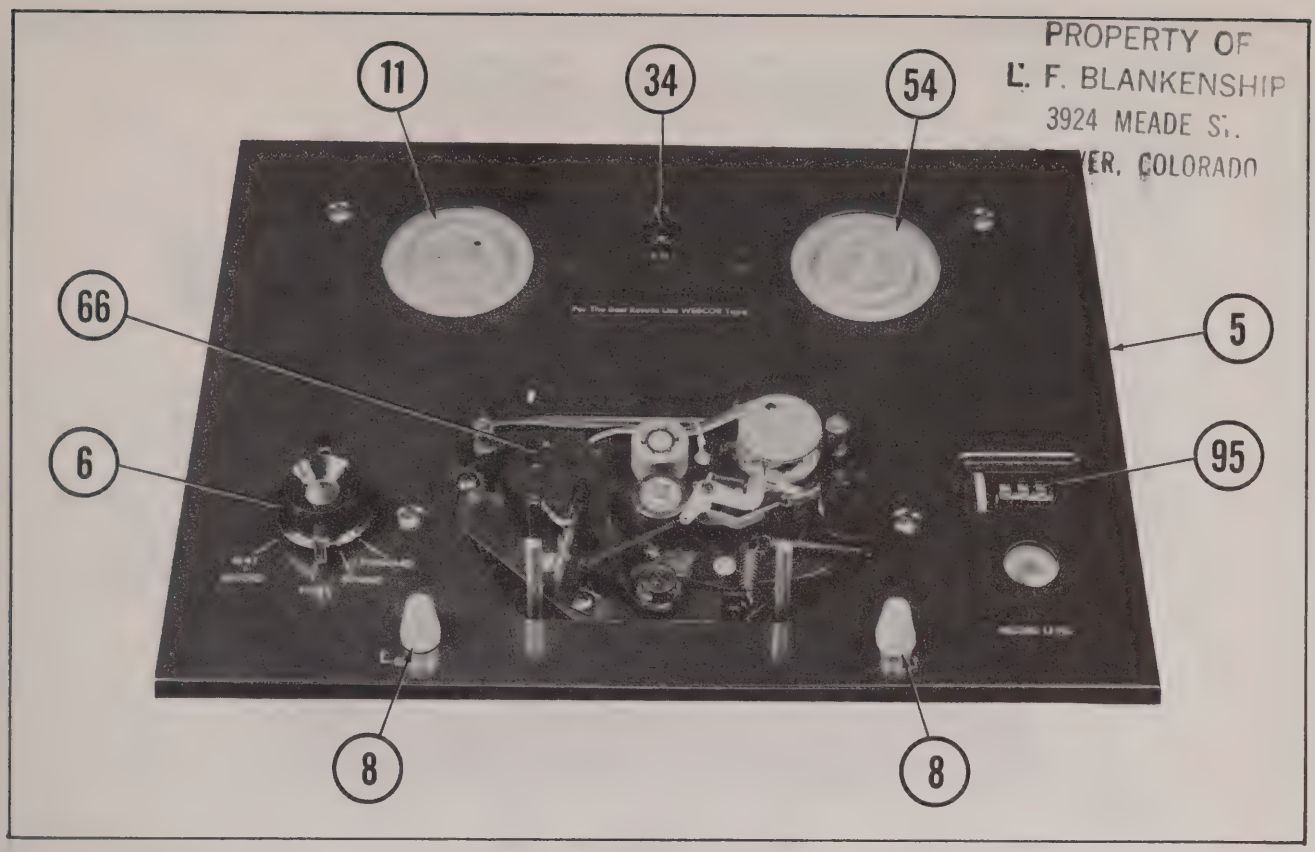

FIGURE 2

2. Place full reel of tape on right hand (supply) hub so that slot in reel hub fits snugly over the shaft key. Do the same with the empty reel on the left hand (take-up) hub.

3. Unwind enough tape to fit through the threading slot and make about three or four turns around the hub of the empty reel.

4. Wind empty reel three or four turns clockwise to take up slack between reels.

NOTE: Be sure the tape reels are wound with the dull side of the tape facing toward the inside of the reel. This is called an "A" wind.

5. Set the Tape Counter to 000.

How To Record From Microphone —

1. Set the Master Playback-Record control to "Stop" position.

2. Insert the line cord plug into a 105 to 125 volt, 60 cycle, AC outlet. Caution: Severe damage will result if connection is made to a direct current (DC) line.

3. Connect microphone to input jack.

4. Turn Volume control clockwise to turn unit "on". Allow sufficient time for amplifier to "warm-up" before starting to record.

5. Adjust recording level by leaving the master control in the "stop" position, monitor control "off", and holding the record knob forward. The recording level indicator is now operative. Speak in a normal voice tone into the microphone and adjust volume so that the shadow or dark segment barely closes on the loudest sounds. Overlap of shadows is not desirable. This will cause over modulation of the tape, resulting in distorted playback.

6. If it is desired to monitor a recording, turn tone-monitor control clockwise until it clicks. (If unit squeals, move mike away from unit or turn tone control clockwsie.)

7. Push record knob forward and turn master control to record position. You are now ready to record. The use of two controls in recording provides a safety precaution against accidentally erasing tape when playing back recordings.

8. Move master control to "stop" position when recording is finished.

NOTE: When recording with monitor "on", tonal quality of monitor can be adjusted to suit the operator. However, the tone control does not effect the tonal quality of the tape being recorded. Record characteristics are pre-set at the factory for optimum recording quality.

How To Play A Recording —

1. Turn the shift knob assembly to "stop" and then into "rewind" position.

2. After tape has re-wound, turn shift knob assembly to "stop" and then to "record-play" position. Do not push record knob forward as this will erase the recording.

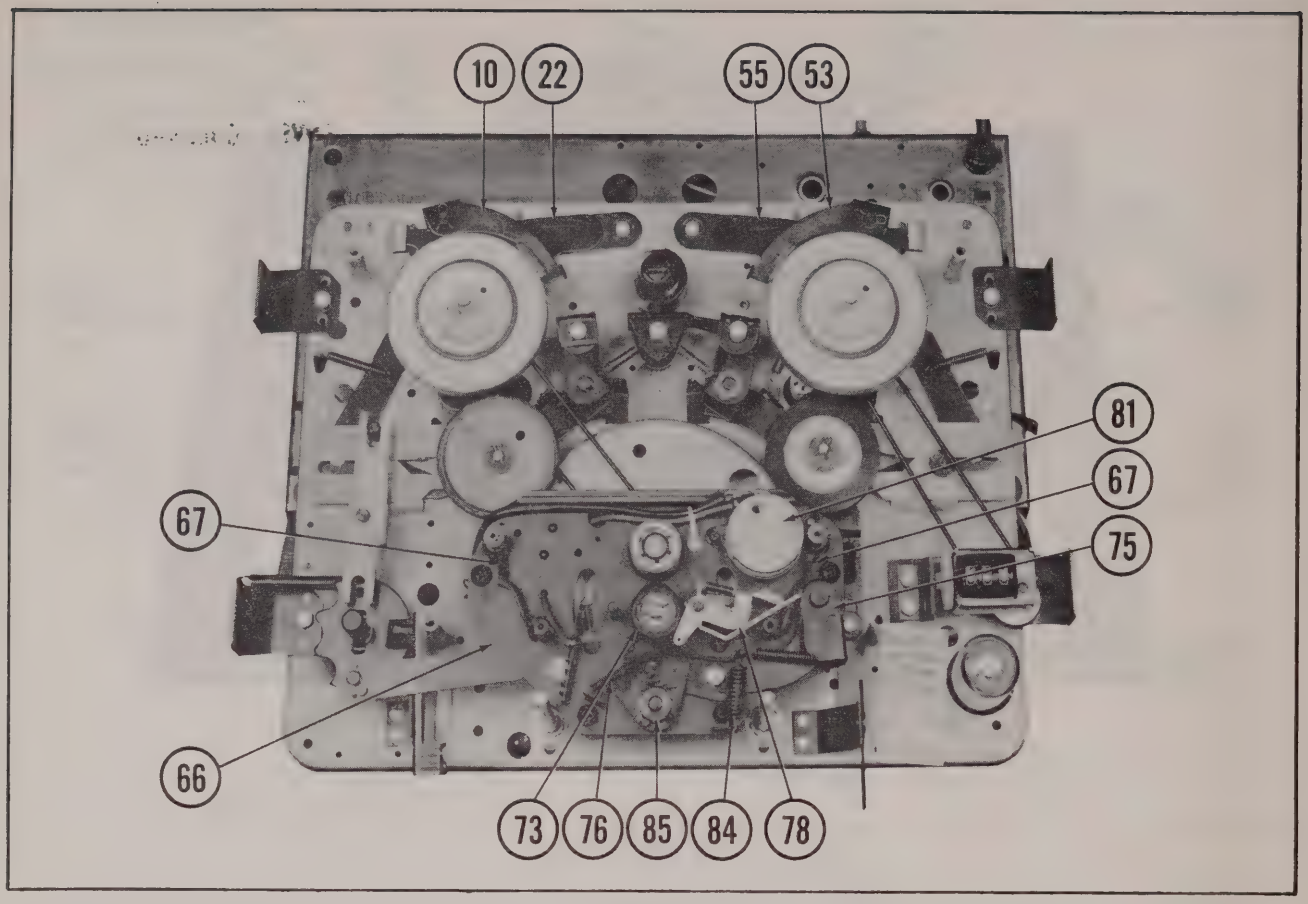

FIGURE 3

3. Set the tone and volume controls for desired listening level.

NOTE: The tone control varies the treble and bass response of the play back.

How To Record From Phono, Radio, Or TV —

1. Connect Webcor input cord No. 2925 between output of radio, phono, or TV receiver to input of tape recorder.

2. If you want to monitor the recording, turn monitor-tone control on/or clockwise.

3. Now follow the same procedure for recording from microphone and playback.

How To Use Recorder As Public Address System —

1. Set the shift knob assembly in the "stop" position.

2. Remove reels from both right and left hubs.

3. Connect microphone to input jack.

4. Push record knob toward rear of unit and turn shift knob assembly to record-play position.

5. Turn monitor control "on".

6. Adjust volume and tone control for desired listening level.

NOTE: If microphone feedback (squeal) occurs, move microphone away from unit or adjust volume to eliminate squeal.

7. You may record your speech during delivery by following recording instructions on page 3.

How To Use Recorder With External Speaker —

1. Plug external speaker into the output jack which is located on the rear of the recorder. (The output impedance is 3.2 ohms.) Use Webcor Output cord No. 2928.

How To Use Recorder With Another Recorder —

1. For recording from another recorder use Webcor No. 2943 Input Output cord. Connect cord from output of auxiliary recorder to input of Viscount. Turn volume control of auxiliary recorder to fairly low level.

2. Adjust volume control of Viscount.

3. Now follow standard recording and playback procedure.

How To Play Recorder
Through External Amplifier —

1. Connect Webcor Output cord No. 2928 from the Ext. Amp. jack at rear of recorder to the phono, or auxiliary input of the external amplifier.

2. Follow same procedure for playback as previously described.

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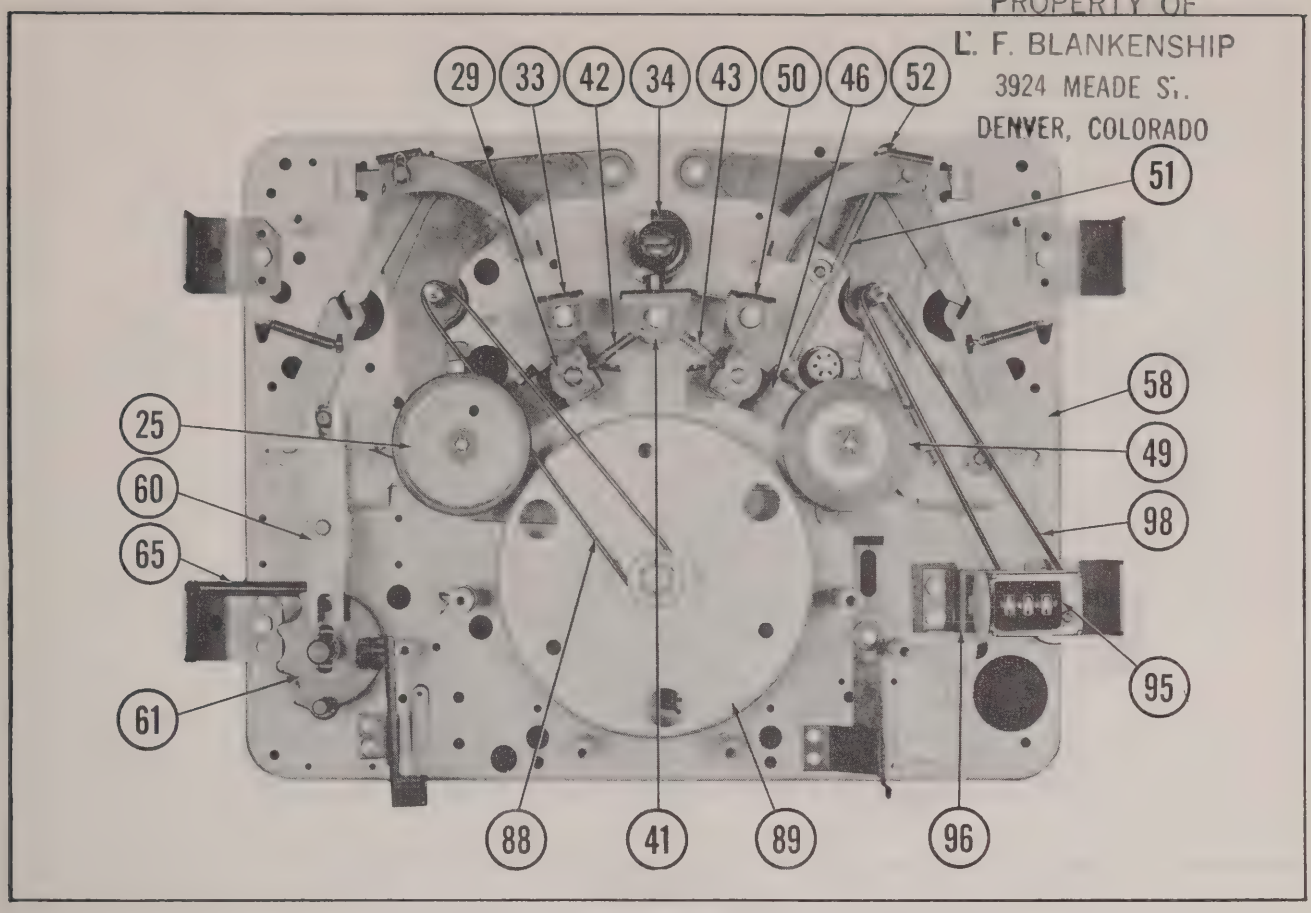

FIGURE 4

NOTE: The external amplifier jack at the rear of the recorder provides cathode follower output of a level of 1 1/2 volts.

How To Use "Rewind" or "Fast Forward" —

1. Turn shift knob assembly counter-clockwise from "stop" position to "rewind" position. For fast forward turn the shift knob assembly through "rewind" position to "forward".

NOTE: Master control may be alternately moved from "rewind" to forward without damage to machine.

How To Erase A Recording —

1. Thread tape to be erased, on machine.

2. Set Volume Control as low as possible.

3. Push Record Lever forward first, then turn shift knob assembly to "Record" position. The recording will erase completely.

If you wish to make a new recording on a tape already recorded without going through the above steps, simply start recording and this will automatically erase the old recording as you make the new one.

ELECTRICAL ADJUSTMENTS

Head Alignment-

Peaking the play-record-erase head (81) requires the following equipment:

2 — Phillips head screw drivers.

1 — 6500 - cycle Pre-recorded alignment tape.

1 — VT Voltmeter

Adjust voltmeter to 10 volts A.C. scale and attach to "Output" receptacle of the recorder. Turn speed selector to 7 1/2 inches per second position. Adjust "Volume" and "Tone" controls to maximum position.

Place recorder in "play" position and insert Phillips head screw drivers into adjusting screws on bracket holding head. By alternately loosening one screw and tightening the other it is possible to determine the point at which the maximum meter reading is obtained.

Adjust pressure pads to center freely on center of pole pieces of head. The pressure pad arms are of soft metal and can be easily formed with the aid of a pair of long-nose pliers.

The recording head teeters on two pivots under the head bracket. The adjustment should never be to the extreme that the bracket rests on the head bridge plate.

In magnetic tape recorders, the high frequency response is extremely sensitive to the alignment of the recording head, and of the contact between tape and recording head.

For reasons of standardization, an attempt is made to align the head gaps on all recorders exactly perpendicular to the tape.

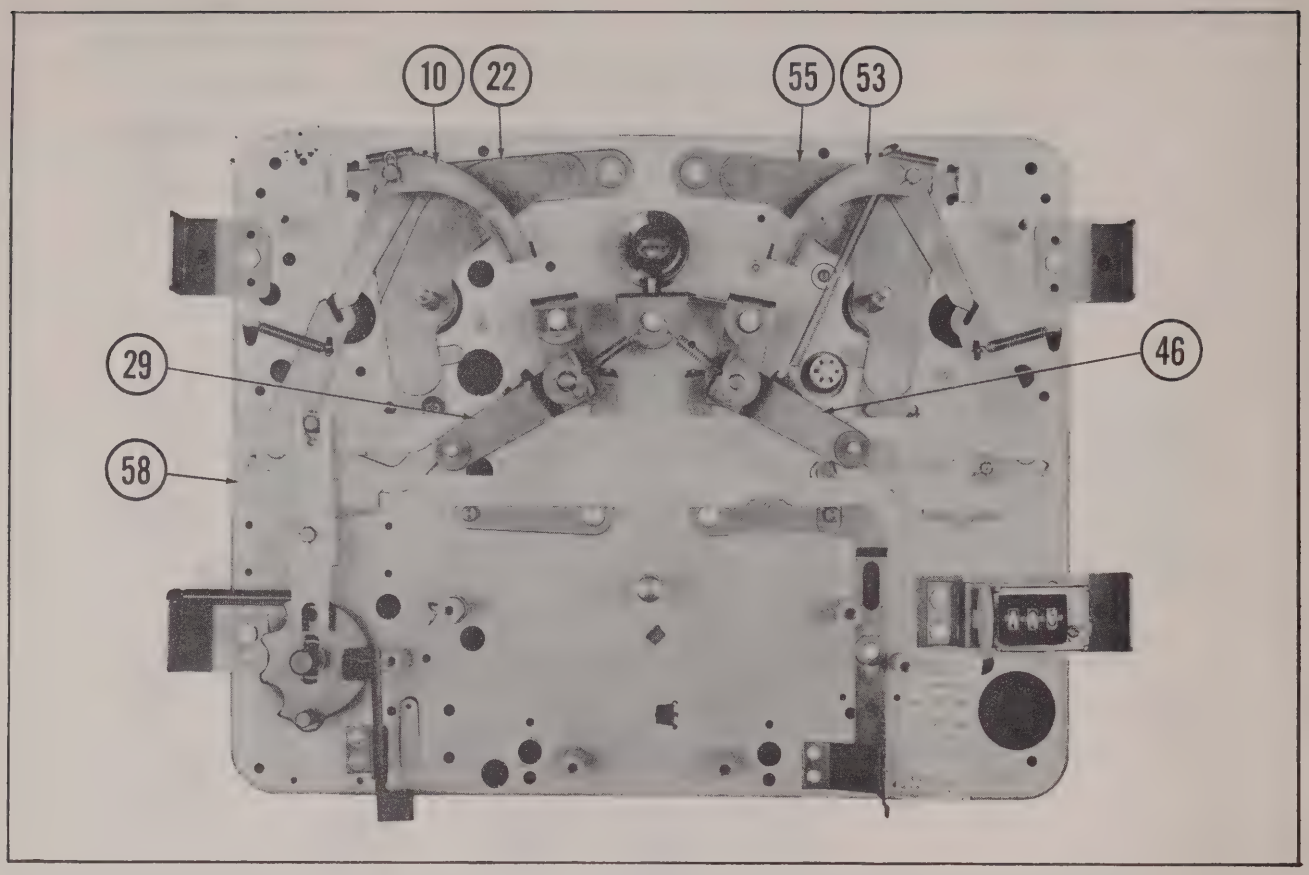

FIGURE 5

This alignment is accomplished by tilting the head for maximum output from a pre-recorded alignment tape upon which a steady 6,500 C.P.S. signal is available.

If the reproducing gap is not parallel to the recording poles, serious loss of high frequencies, track overlap and poor erase may result.

Adjusting 6E5 "Magic Eye" Indicator Tube-

1. To check sensitivity of the tube to signal a meter of at least .5 megohm input or equivalent equipment is required.

2. At 1 volt input the output should read 3.2 volts at the output jack with output control in "Record" position.

3. At the high side of the eye adjustment control (R3) to ground at (Point A on Schematic) the voltage should be 6-8 volts A.C.

4. A higher reading normally indicates an insensitive 6E5 tube, or Diode and should be replaced.

5. Use a 1000 cycle frequency signal of .07 volts in the input.

6. Turn output selector knob to "Record" position.

7. Vary the volume control until output voltage reads 3.0 volts at the output jack, (unloaded).

8. Adjust (R3), Eye adjustment control, until "eye" barely closes.

MECHANICAL TROUBLE SHOOTING

If the complaint or trouble on a given recorder to be serviced is not known it is suggested that the "Operating Instructions" be completely performed while referring to the "Functions Of The Controls". From this procedure it can be determined if the transport of tape is normal and, therefore, if the trouble is mechanical, electrical or possibly a combination of both. If improper operation of the tape transport mechanism is noted, reference to the sample list of troubles and possible causes will assist correction. It is possible that normal tape transport occurs but that electrical trouble prevents the proper recording or playback of the tape. Whether or not such trouble exists can be determined by making a sample recording and attempting to play it back.

CLEANING

The majority of defects, other than wear or breakage, can be traced to dirty surfaces. The recording head (81) capstan, and pressure roller (73) are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. This accumulation should be periodically removed since it may cause faint recording and poor playback. Wipe off the above surfaces carefully with a clean cloth. If dirt is caked or hard and will not come off with a dry cloth, dampen cloth slightly with Carbon Tetrachloride.

LUBRICATION

When required, as indicated by binding or other abnormal operation, lubricate the points indicated on the exploded views. Points indicated by a dot (●) on

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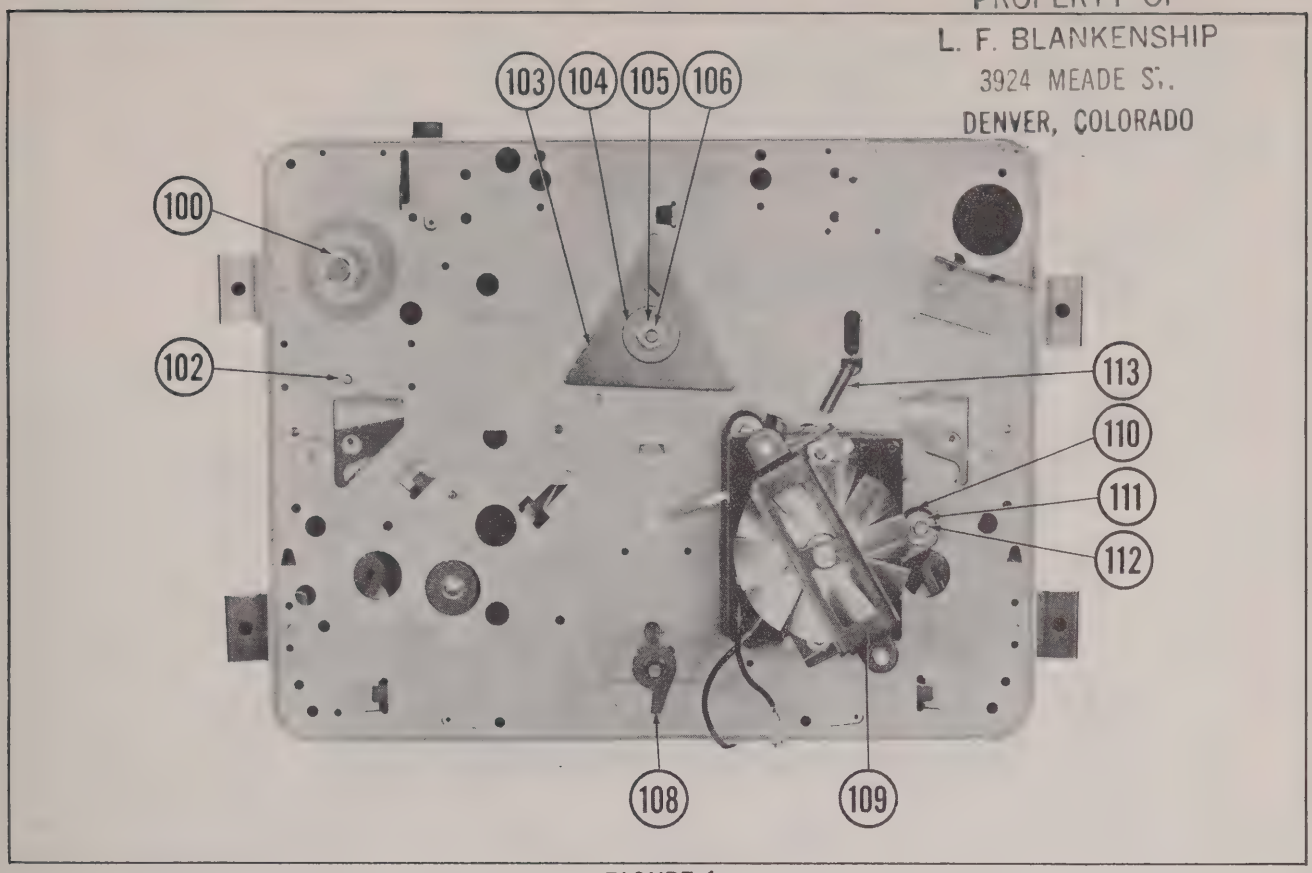


FIGURE 6

the exploded views should be lubricated with a drop or two of No. 10 light sewing machine type oil. Points indicated by a square (■) on the exploded views should be lubricated with a high temperature grease of medium consistency. The basic rule is — do not over lubricate. Oil and grease must be kept off all rubber idlers, belts, and periphery of flywheel and off parts that might transfer oil or grease to them. Always wipe excess lubricant from parts that have been lubricated.

Checking Tape Speed-

A marked variation from normal tape speed is a good indication of worn idler wheels, or the need for lubrication. Since it is not practical to check tape speed directly, the speed of the capstan which controls tape speed may be checked. Since the speed of the reels varies with the amount of tape wound, it is not possible to use the reel speed to check the speed of the tape. The capstan speed should be checked while it is under normal tape load in the Record or Playback position. Normal capstan speed should be 152 to 159 R. P. M. with the speed selector in the 7 1/2 inches per second position or 76 to 80 R. P. M. with the speed selector in the 3 3/4 inches per second position. It will be found much easier to check the R. P. M. with the tape running at 3 3/4 inches per second. A simple method that may be employed to check the capstan speed consists of securing a small strip of tape to the outer edge on top of the capstan. By using the second hand of a watch, the actual number of turns occuring in one minute can be easily counted.

A 1200 foot 7 inch reel of tape should fast wind in about 3 minutes. Variations in fast transport speed may be the result of normal clutch slippage.

Wow-Waver-

Anything that causes the tape to pass the recording head at a varying speed will result in Wow-Waver. This gives a varying pitch or tinny sound which is most noticeable when recording or playing back piano, organ or slow passages of classical music. One means of checking for Wow is to play back a pre-recorded high frequency test tape. If wow is present, it will be noticeable to the ear. The capstan and drum assembly, pressure roller, and idler wheels are manufactured to a very close tolerance to assure a minimum of Wow-Waver. The development of such a condition is generally due to one or more of the following causes:

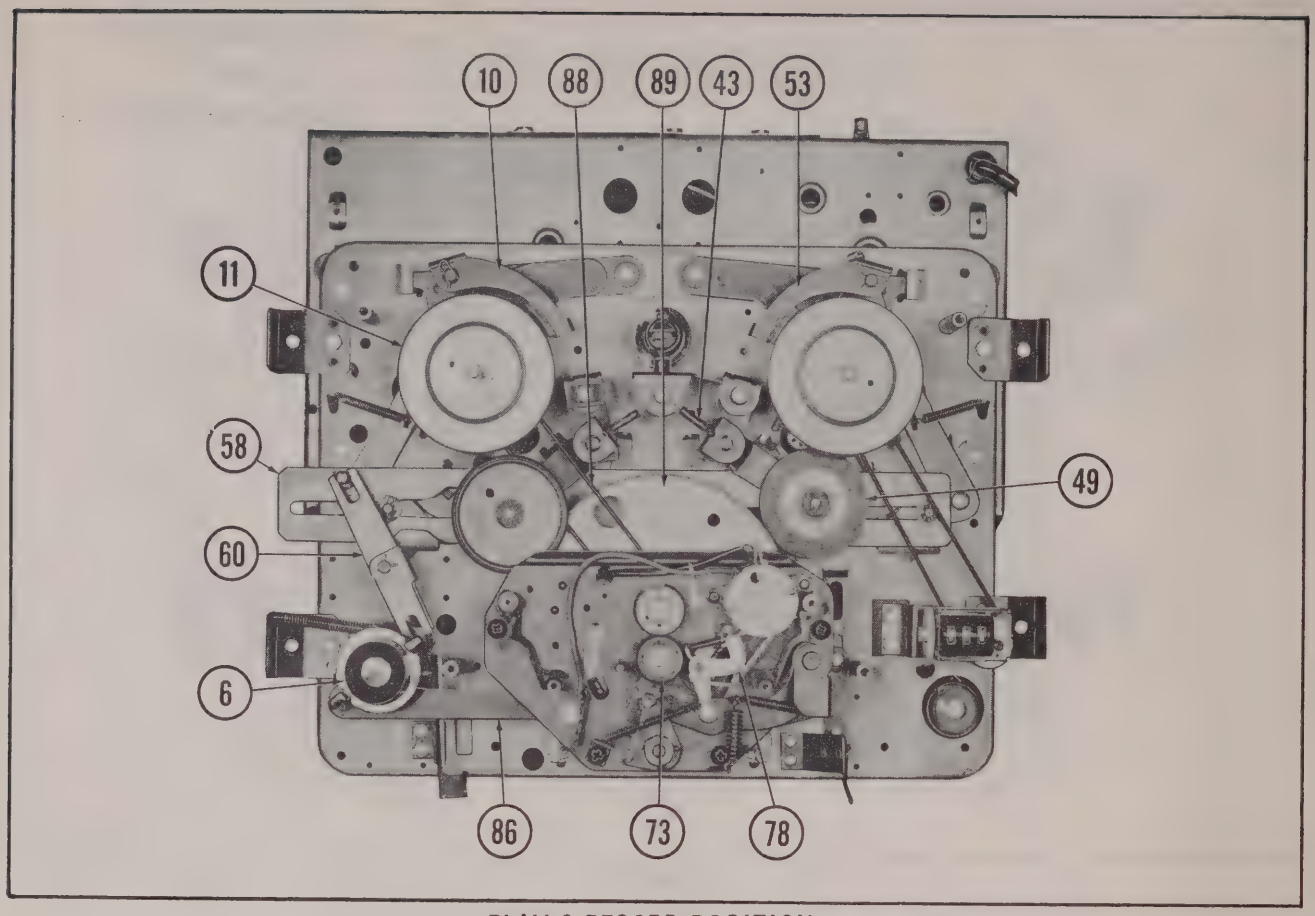
1. Contaminated capstan surface (73). The capstan surface must be kept free of oil and iron oxide particles. This surface should be thoroughly dried after the application of alcohol.

2. Dirty capstan drum (89), pressure roller (73), idler wheel (49), or motor shaft. Use alcohol on all clean cloth and wipe the driving surfaces of these parts. Do not use carbon tetrachloride when cleaning any rubber surface.

3. A worn or pitted pressure roller (73) or idler wheel (49). These should be replaced.

4. The pressure roller (73) should be parallel with the capstan. If the mounting shaft is bent, it should be straightened.

5. The pressure roller tension spring may be exerting insufficient tensions. This would allow the pressure roller (73) to be moved (by hand) away from the capstan with only light force applied. The pressure roller should contact the capstan with a force of



PLAY & RECORD POSITION

Turning shift knob (6) to the Play & Record position actuates control shaft assembly (61), also actuates cam plate (60) and control link (86). Control link (86) actuates bell crank (87), thus bring the pressure pad assembly (78) into contact with the head pole surfaces, also pressure roller (73) is brought into contact with the capstan. At the same instant cam plate (60), which is connected to the cam plate and stud assembly (58), moves the cam plate and stud assembly to the left and allows wheel assembly (49) to be pulled into contact with the flywheel and motor pulley by action of spring (43). The flywheel drives the take-up hub (11) thru the rubber belt (88).

2 to 2 1/4 lbs. This may be checked with a spring scale.

6. Idler wheel (49) eccentric or tilted. If the wheel is tilted, reform the wheel arm so the idler appears level to the eye.

Tape Squeal-

A squeal or squeaking effect will sometimes be encountered after many hours of operation. This generally is caused by an accumulation of tape coating oxide on the pressure pads and possible compressing of the pads which, in turn, exert excessive pressure on the recording tape, causing friction.

Tape that has been abused in storage or use may cause an excessive accumulation or iron oxide particles to adhere to the tape guides, pressure pads, or recording head. This resistance to smooth tape transport will cause a friction squeal. Usually, cleaning these components with alcohol, or replacing them if necessary will correct the trouble.

Varying frictional forces can be a source of frequency modulation noise that may be introduced into the program when recording, and subsequent playback. This frequency modulation noise is most pronounced on high audio frequencies.

The most common causes for this difficulty are:

1. Mis-aligned heads.

2. Dirty pressure pads, guides, or head pole pieces.

3. Excessive tape tension.

4. Worn or grooved guides or head pole pieces.

5. Pressure roller binding, hardened, or worn.

6. Softening of tape binder from heat and humidity.

7. Excessive pressure pad pressure, or acute angle.

Pressure pad springs can be stretched to reduce tension, but may affect output. The pressure pad arms are formed of soft metal that can be easily bent to change the pad angle or position.

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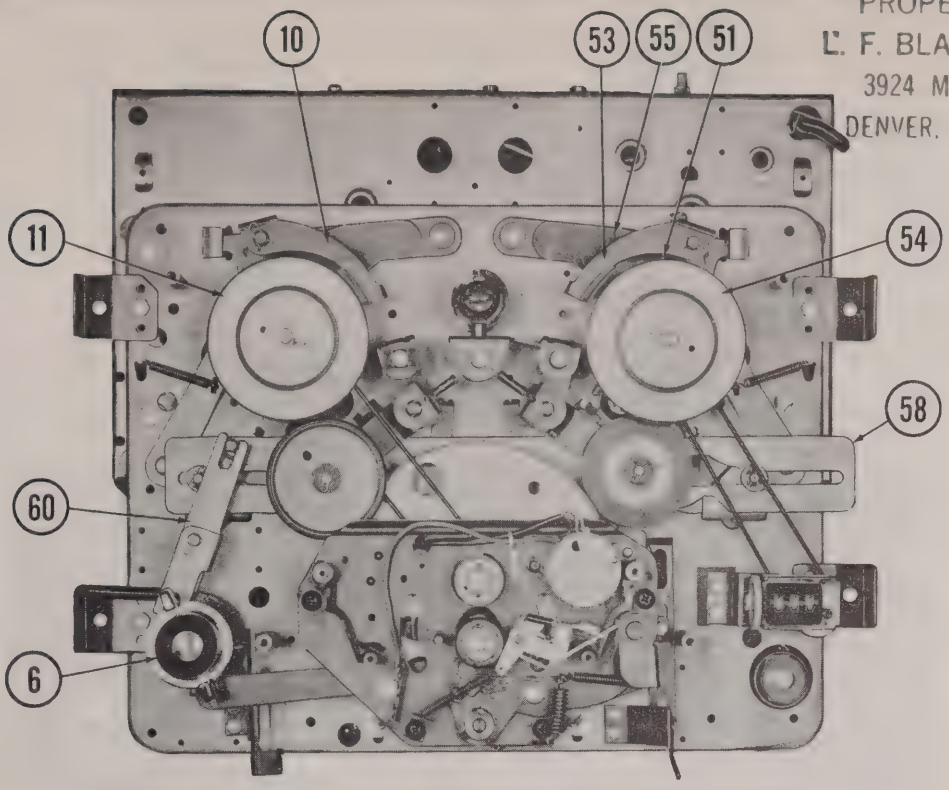


REWIND POSITION

Turning shift knob (6) to the "Rewind" position actuates cam plate (60) which moves cam plate and stud assembly (58) to the right. This releases the right reel arm assembly (55) and allows the rewind hub and drive wheel (54) to be pulled into contact with the motor pulley by action of spring (51). Simultaneously the brakes are released by the action of the cam plate and stud assembly (58). Pressure pads and pressure roller are not actuated in this position so they remain in the "Stop" position.

MECHANICAL ADJUSTMENTS

Mechanical adjustments will be found to consist of forming a mechanism or part into correct position if it is not functioning properly, or replacement of the part.

Pressure Roller-

The pressure roller (73) should be parallel with the capstan. With the spring clip (70) holding the pressure roller removed, the pressure roller should not climb up the capstan. If it is not parallel, a close fitting pipe may be inserted over the pressure roller shaft to supply leverage for bending it. The pressure roller may also be moved up on its shaft to provide a holding surface for bending. Care must be taken not to nick the shaft.

Idler Wheel (49)-

Idler wheel (49) should contact flywheel (89) squarely and not at an angle. With the tape speed selector (34) set to 3 3/4 inches per second, idler wheel (49) should contact the small diameter portion of the motor shaft. If the idler wheel is too low, it will rub on the large diameter of the motor shaft. The idler wheel arm (46) can be reformed to place the idler wheel in the correct position. The number of washers under the idler wheel may be varied to prevent vertical play.

Pressure Pads-

The pressure pads must clear the recording head housing and rest firmly and freely against the pole pieces. The pressure pad arms are made of soft metal which can easily be formed to properly position the pads against the pole pieces. The pads may be replaced by carefully pulling them from the pad arms and inserting new pads using household cement.

Pole Piece Replacement-

When the erase pole piece or record pole piece becomes worn or pitted, they should be replaced. Either pole piece may be removed by inserting a knife blade under the pole piece and prying it loose. Pliers are convenient to complete the removal of the pole piece.

CAUTION: Magnetized tools should not be used when working on or near the head.

The new pole piece is inserted in the same position as the old pole piece. A soft piece of wood should be used to seat the new pole piece.

Clutch Assembly (11)-

There is no adjustment to be made on clutch and brake drum assembly (11). If excessive slippage occurs, the worn part or unit should be replaced.

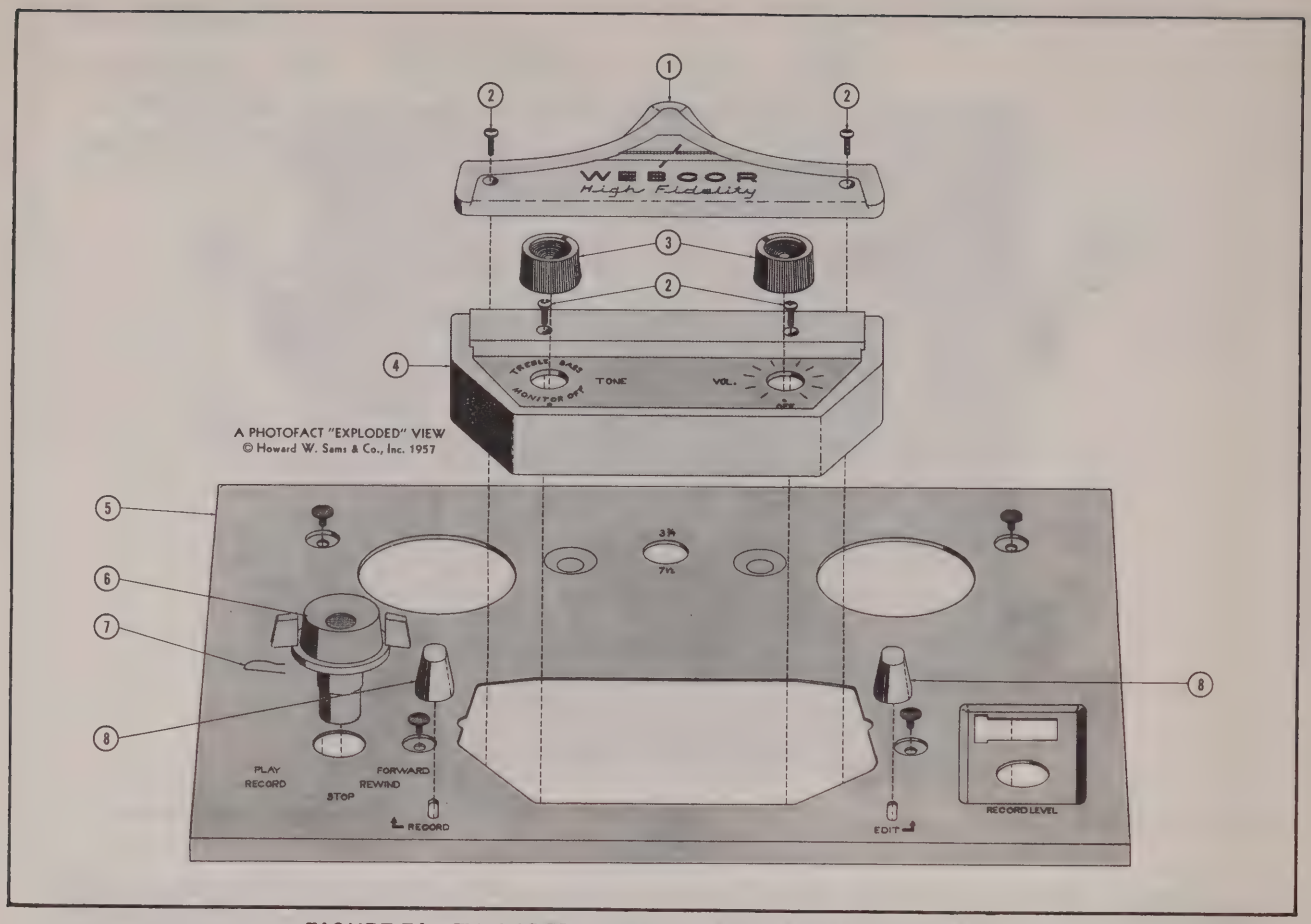


FIGURE 7A. EXPLODED VIEW OF PARTS ABOVE TOP PLATE

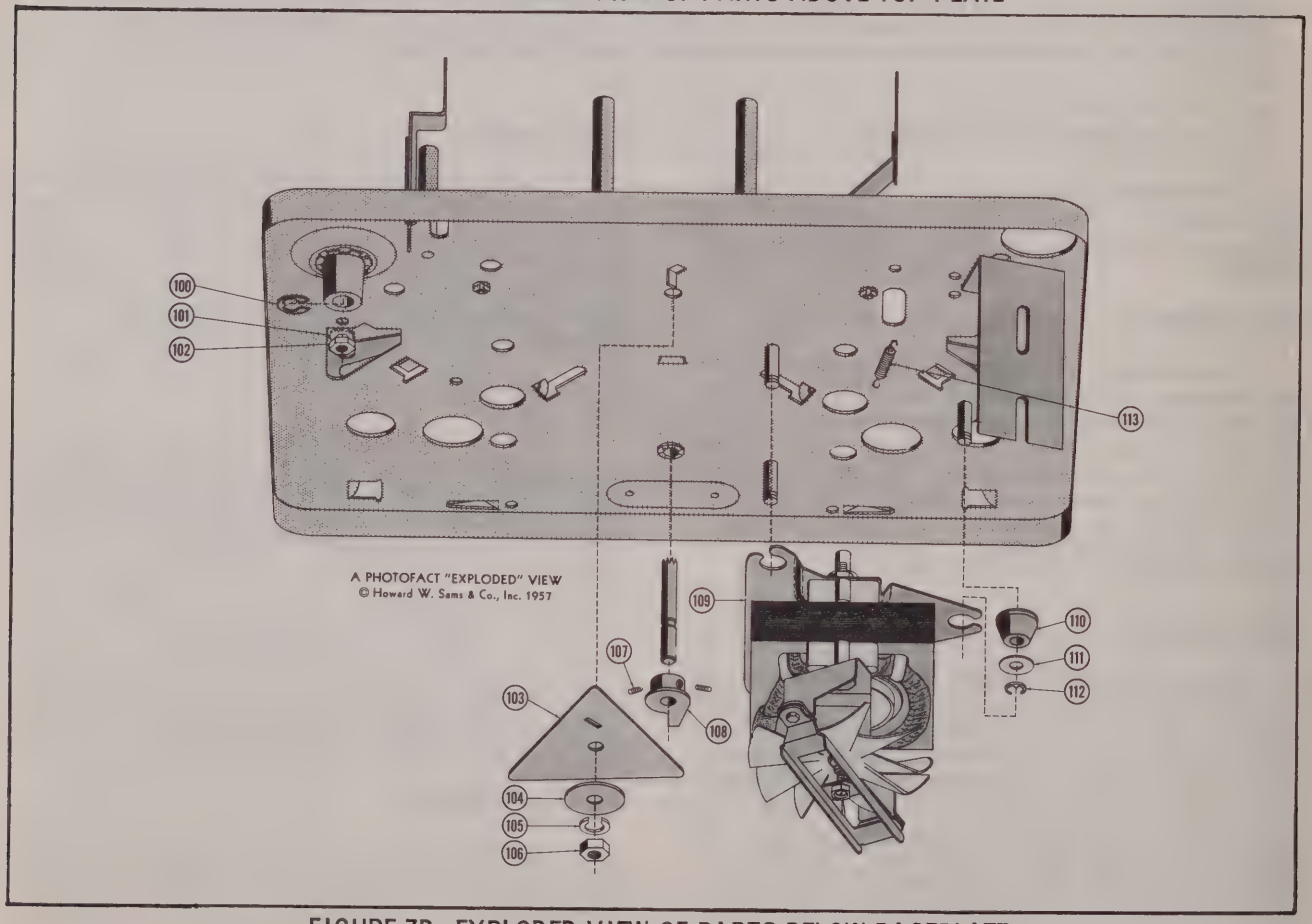


FIGURE 7B. EXPLODED VIEW OF PARTS BELOW BASEPLATE

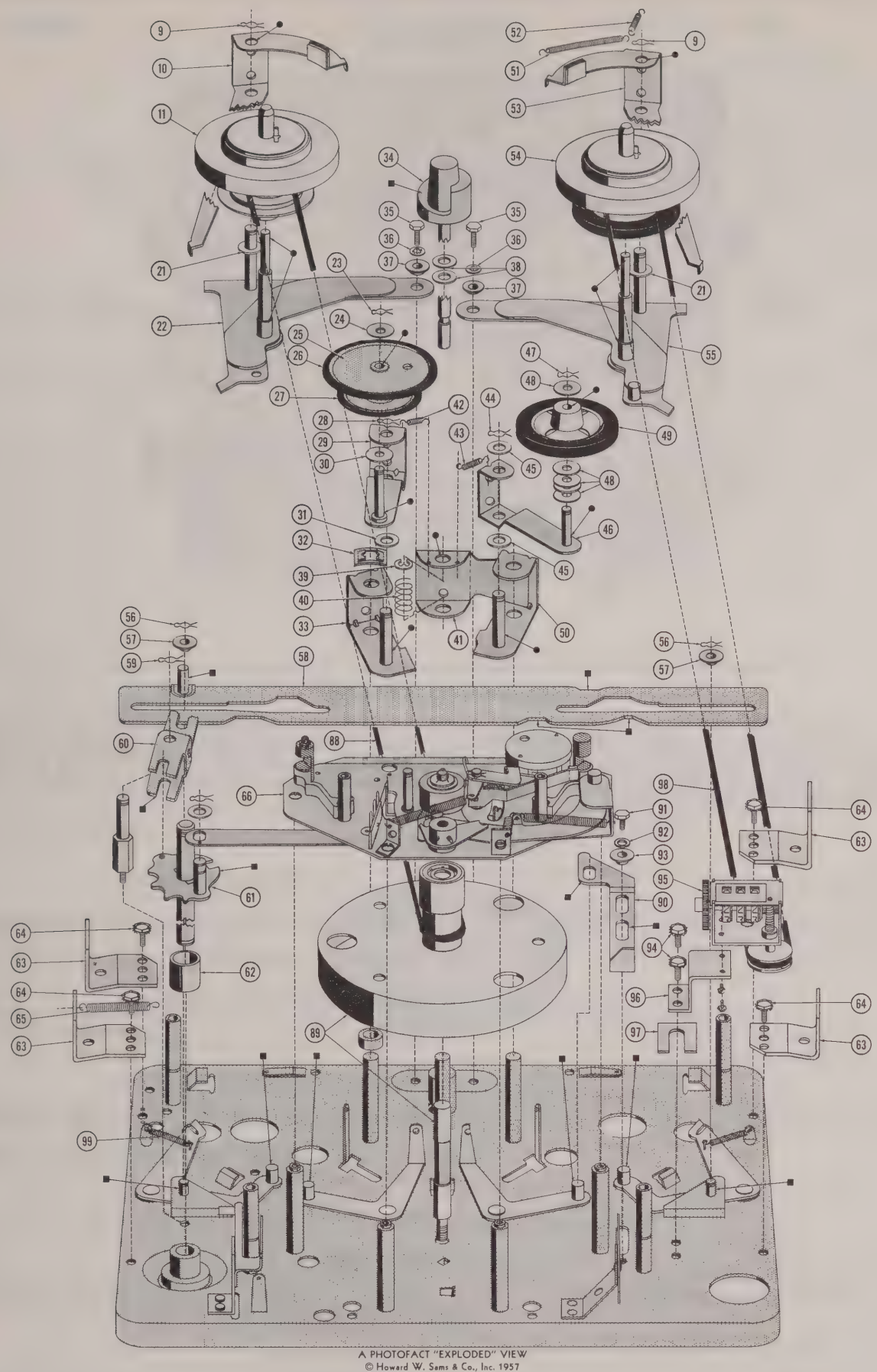
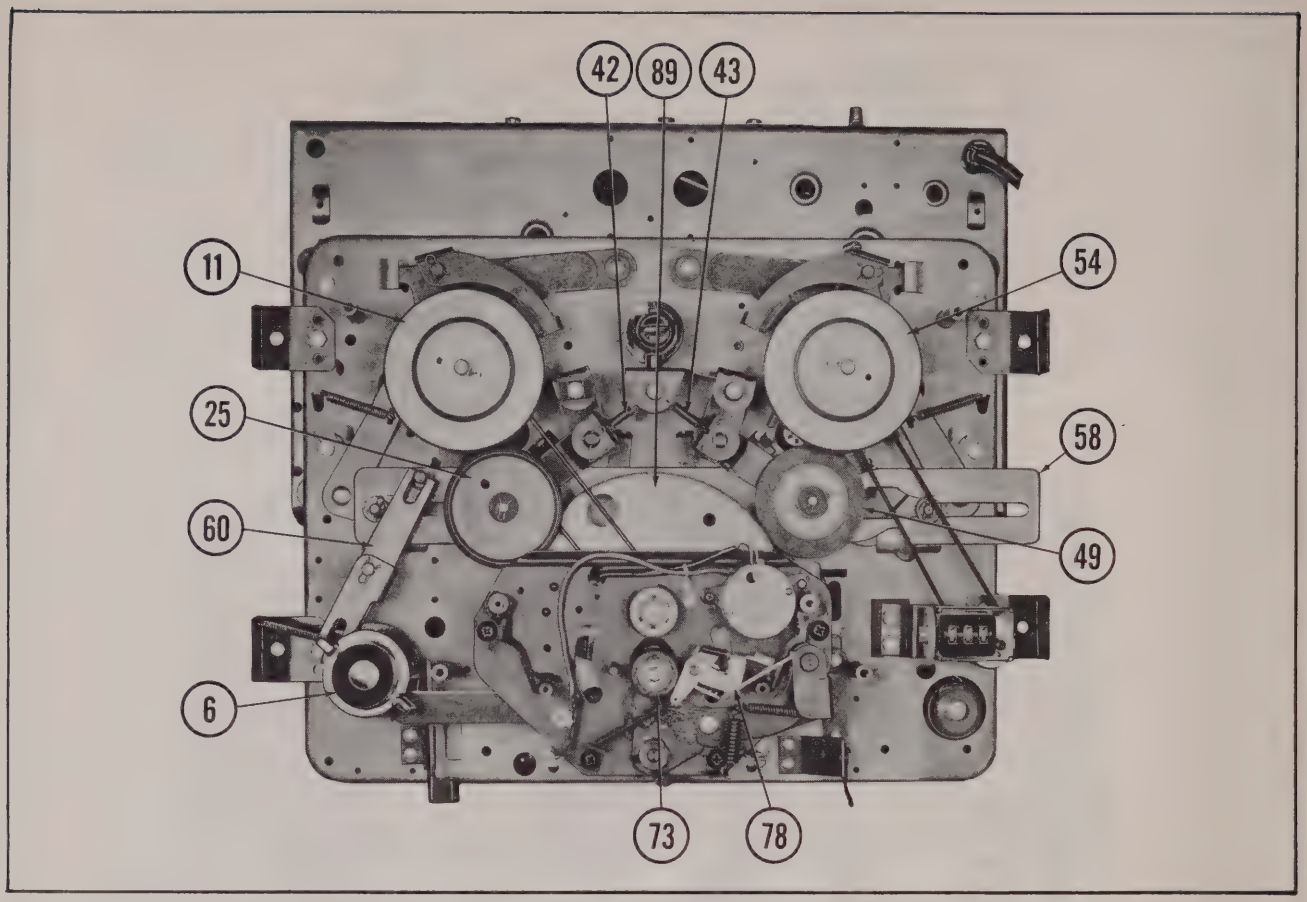


FIGURE 7C. EXPLODED VIEW OF PARTS ABOVE BASEPLATE



FAST FORWARD POSITION

Turning shift knob (6) to "Fast Forward" moves cam plate and stud assembly (58) to its extreme right. This permits drive wheel (49) to be pulled into contact with the motor pulley and flywheel by action of spring (43). Also, fast forward drive wheel (25) is drawn into contact with flywheel (89) and take-up hub (11) by action of spring (42). Pressure pads and pressure roller are not actuated in this position so they remain in the "Stop" position.

MECHANICAL TROUBLES

TROUBLE	POSSIBLE CAUSES
Take-Up reel fails to rotate in "Play" or "Record".	1. Brake pad assemblies (10) or (53) operating improperly. 2. Faulty clutch assembly (11). 3. Binding or bent take-up reel shaft.
Supply reel fails to yield tape in "Play" or yield tape in "Play" or "Record".	1. Binding or bent supply reel shaft. 2. Brake arm (53) not operating properly.
Failure to "Fast Wind".	1. Brake pad assemblies (10) or (53) operating improperly. 2. Oil or grease on motor shaft, idler wheel (49), capstan drum (89), fast drive wheel (25), or brake drum (11). 3. Spring (42) or (43) missing, disconnected, or broken. 4. Motor defective.
Weak or no recording and playback of tape.	1. Improper alignment of play-record-erase head (81). (See "Head Alignment" instructions). 2. Worn pressure pads. 3. Check for missing, disconnected, or broken spring on pressure pad assembly (78).

TROUBLE	POSSIBLE CAUSES
	4. Check mechanical and electrical operation of play-record switch (M1). 5. Defective play-record-erase head (81).
Failure to "Fast Rewind".	1. Oil or grease on motor pulley, and clutch drive wheel (54B). 2. Brake assemblies (10) or (53) operating improperly. 3. Motor not operating.
Supply reel spills tape when record-playback control is turned to "Stop".	1. Worn brake pad on brake assembly (53). 2. Check brake action.
Counter does not register.	1. Counter belt (98) broken. 2. Re-set wheel binding on top plate.
Erratic tape speed.	1. Oil or grease on motor pulley, idler wheel (49), capstan drum (89), or pressure roller (73). 2. Worn idler wheel (49). 3. Brake assembly (53) not releasing properly. 4. Capstan assembly (89) binding. 5. Supply reel drum (54) binding. 6. Bent or binding motor shaft. 7. Motor bearings in need of oil. 8. Spring (43) not strong enough to hold idler wheel (49) in good contact with motor pulley and capstan drum (89).
Motor fails to operate.	1. Motor defective electrically. 2. Bent or binding motor shaft. 3. Motor bearings in need of oil.
Motor operates only in "Stop" and "Rewind" positions.	1. Capstan shaft or drum (89) bent and binding.
Capstan fails to rotate in "Play" and "Record", but motor operates.	1. Spring (43) broken or disconnected. 2. Oil or grease on motor shaft, idler wheel (49), and capstan drum (89).
Erase and record head pads (78) fail to move properly in "Stop", "Play", or "Record".	1. The two springs in pressure pad assembly (78) missing, disconnected, or broken. 2. Spring (76) missing, disconnected or broken. 3. Binding pad assembly (78).
Pressure roller (73) fails to engage capstan in "Play" or "Record".	1. Spring (84A) missing, disconnected, or broken. 2. Binding pressure roller assembly (73). 3. Loose set screws in pressure roller cam (85).

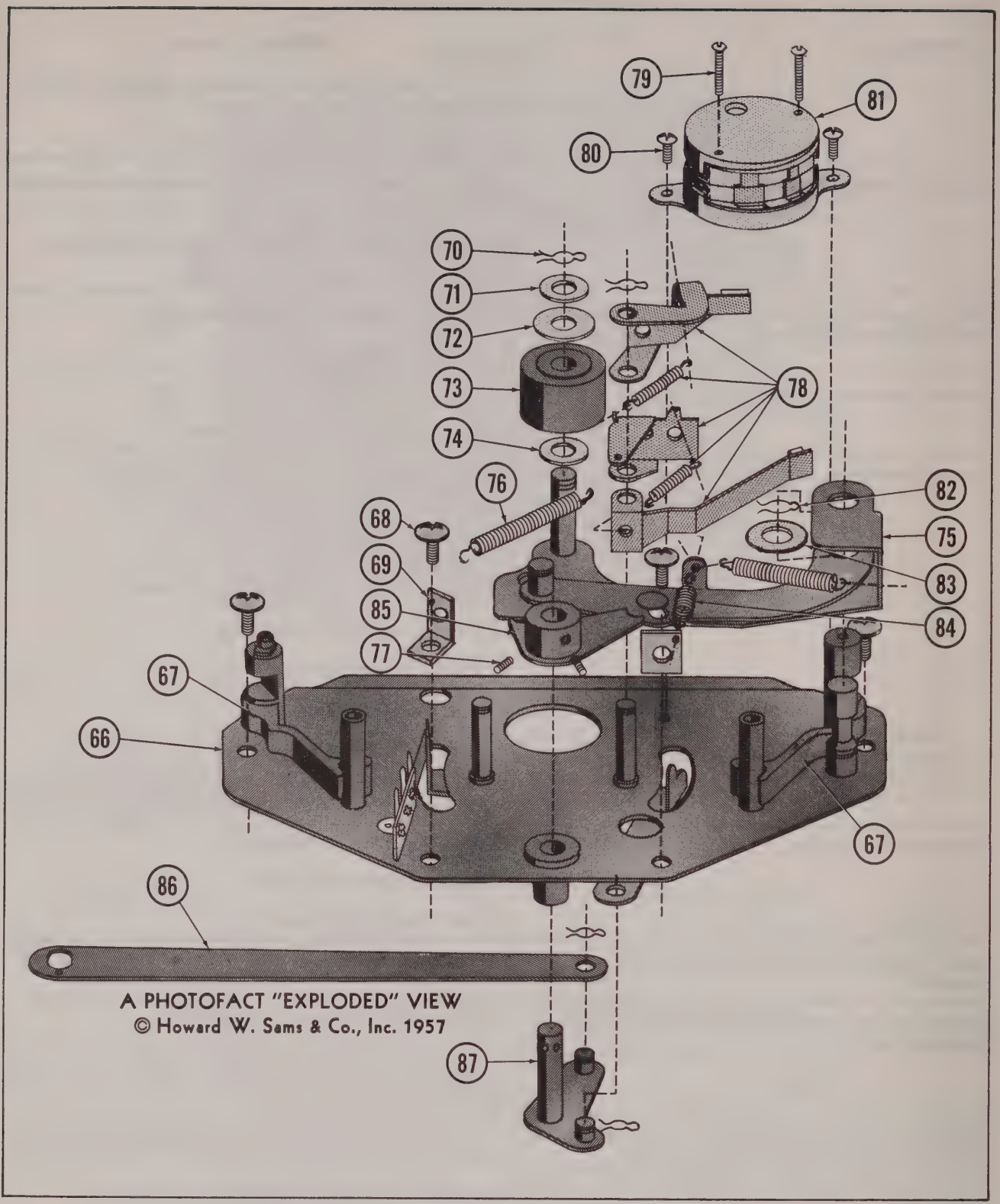
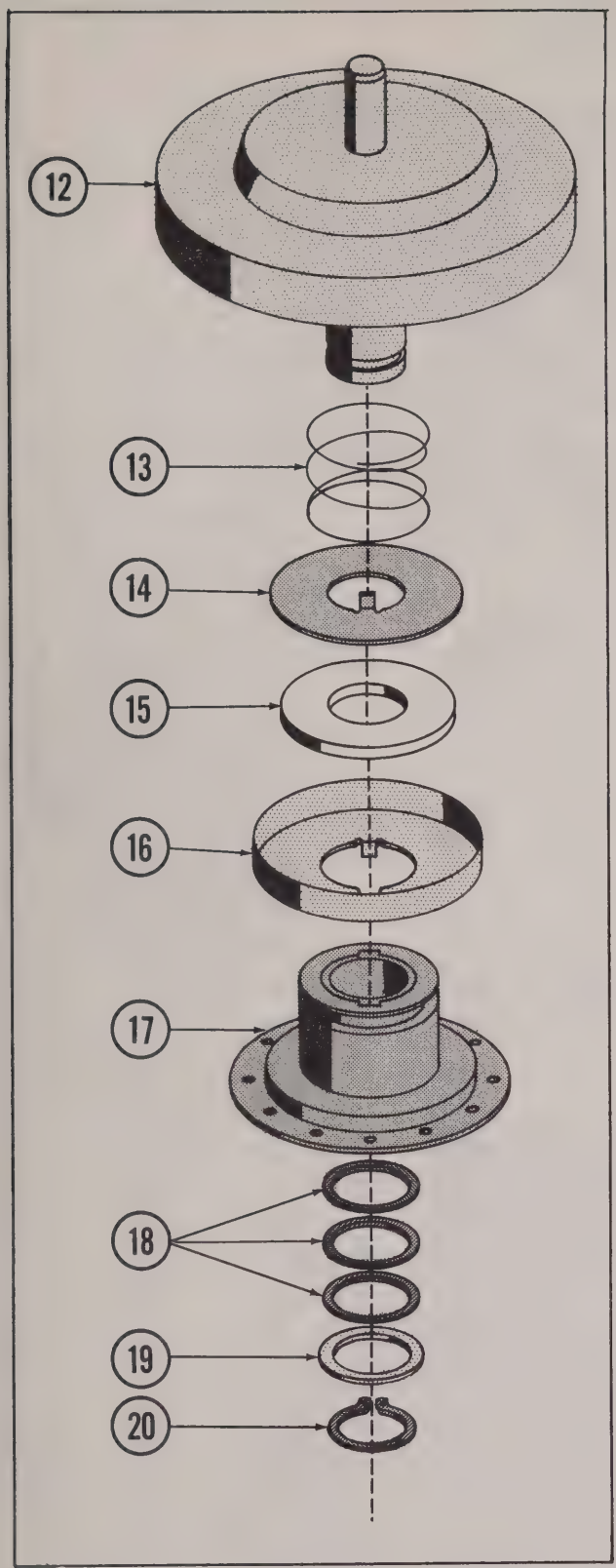
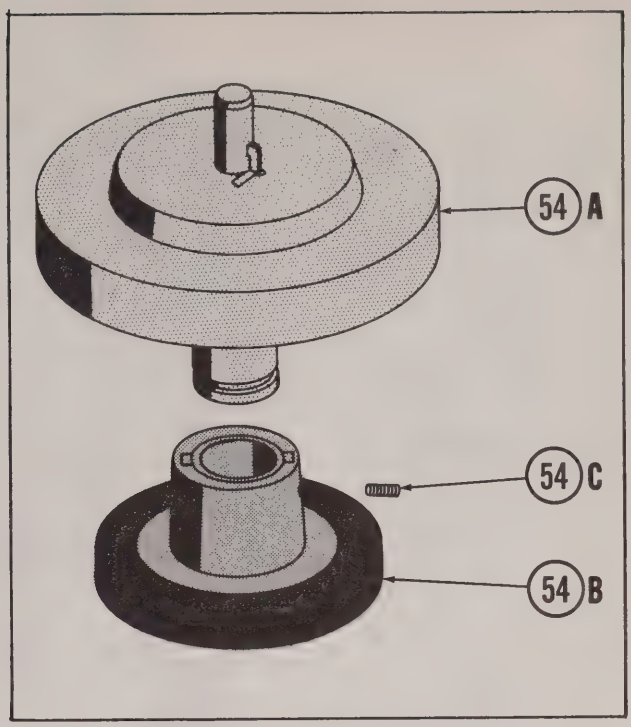


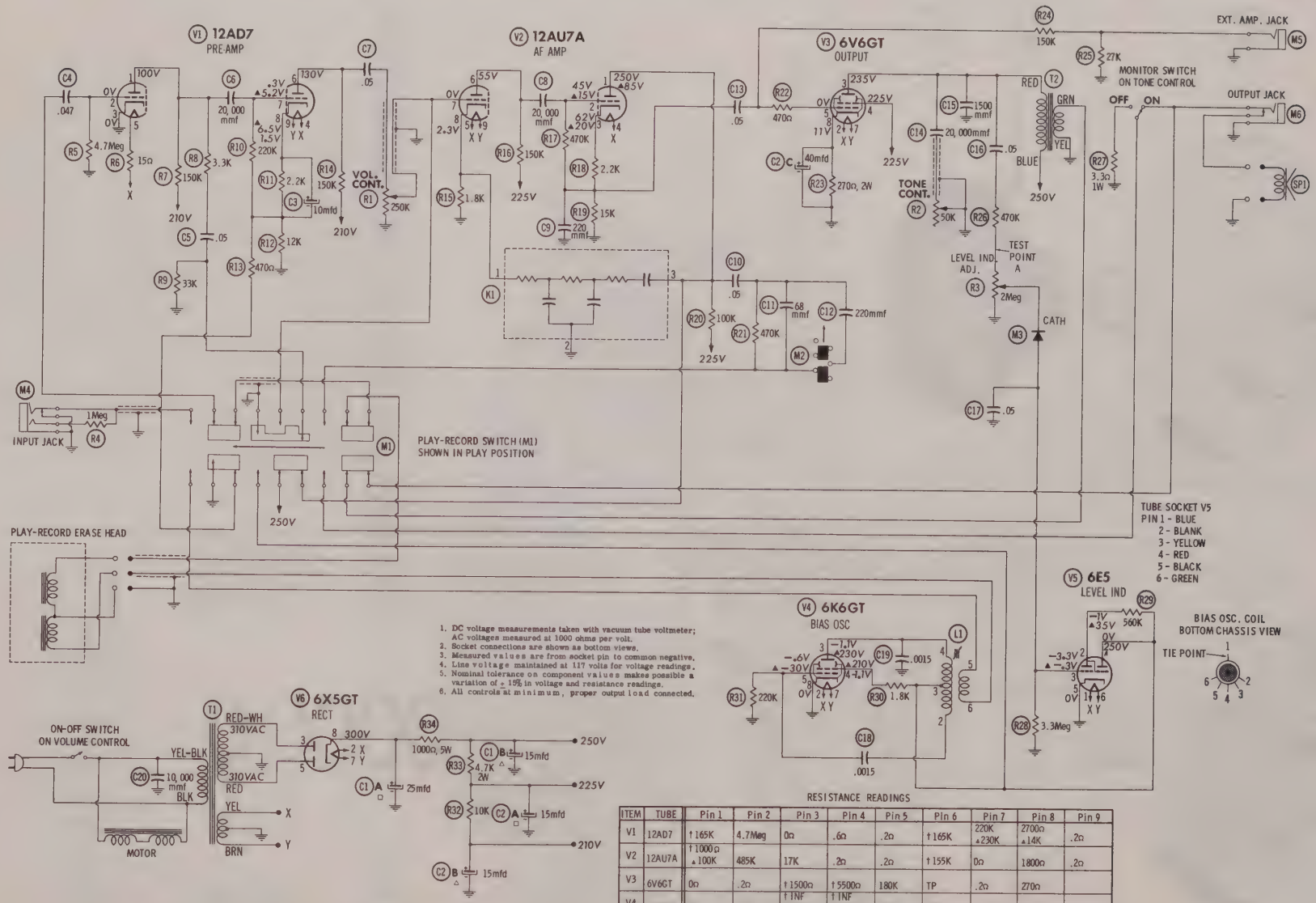
FIGURE 8. EXPLODED VIEW OF HEAD ASSEMBLY



BRAKE DRUM & BEARING ASS'Y.



BRAKE DRUM & CLUTCH DRIVE WHEEL



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AD7	†165K	4.7Meg	0Ω	.6Ω	.2Ω	†165K	220K ▲230K	2700Ω ▲14K	.2Ω
V2	12AU7A	†1000Ω ▲100K	485K	17K	.2Ω	.2Ω	†155K	0Ω	1800Ω	.2Ω
V3	6V6GT	0Ω	.2Ω	†1500Ω	†5500Ω	180K	TP	.2Ω	270Ω	
V4	6K6GT	0Ω	.2Ω	†INF ▲1000Ω	†INF ▲2800Ω	220K	NC	.2Ω	0Ω	
V5	6E5	.2Ω	†INF ▲560K	3.3Meg	†INF ▲1000Ω	0Ω	.2Ω			
V6	6X5GT	NC	.2Ω	220Ω	TP	200Ω	NC	.2Ω	50K	

MEASURED IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.
NC NO CONNECTION
TP TIE POINT
▲ MEASURED IN "RECORD" POSITION.
† MEASURED FROM PIN 8 OF V6.

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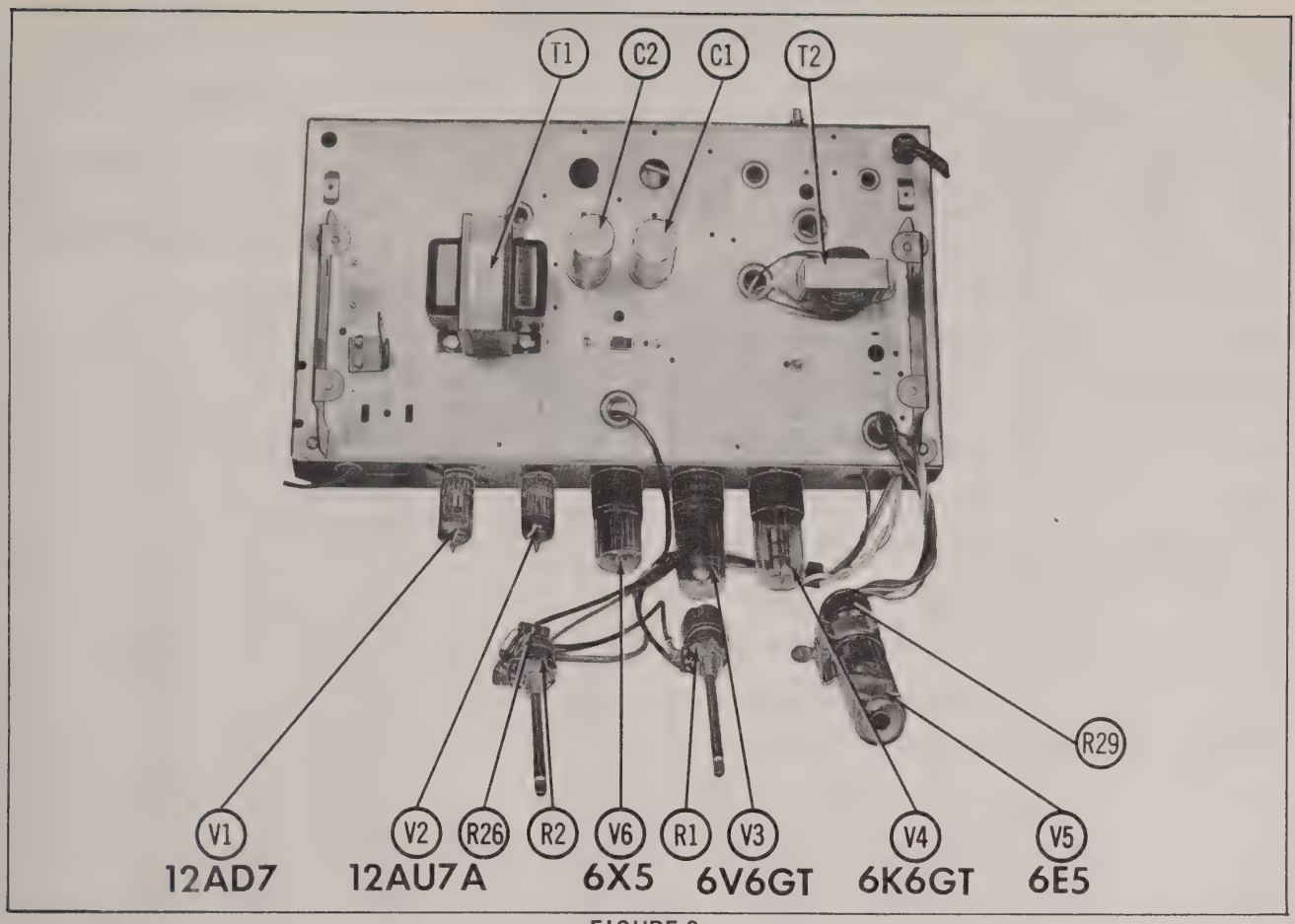

FIGURE 9

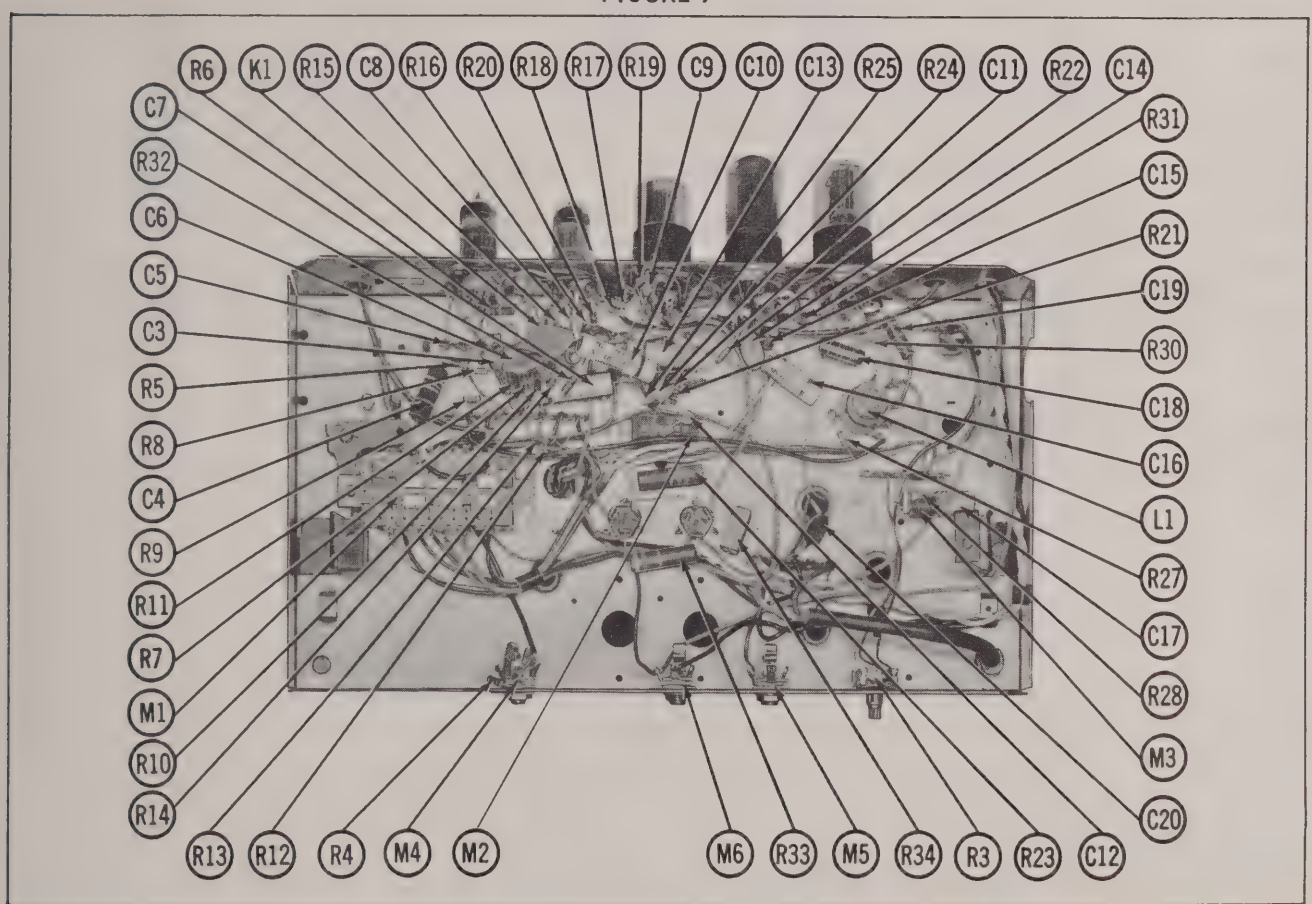

FIGURE 10

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
V1	12AD7	12AD7,
V2	12AU7A	12AU7A,
V3	6V6GT	6V6GT,
V4	6K6GT	6K6GT,
V5	6E5	6E5,
V6	6X5	6X5,
C1A	30P049	Cap., Electrolytic, 25mfd. @ 450V.
C1B		Cap., Electrolytic, 15mfd. @ 350V.
C2A	30P050	Cap., Electrolytic, 15mfd. @ 350V.
C2B		Cap., Electrolytic, 15mfd. @ 250V.
C2C		Cap., Electrolytic, 40mfd. @ 25V.
C3	30P265	Cap., Electrolytic, 10mfd. @ 25V.
C4		Cap., Molded Tub., .047mfd. @400V.
C5		Cap. Molded Tub., .05mfd. @ 400V.
C6		Cap., Ceramic Disc, 20,000mmf. @500V.
C7		Cap., Molded Tub., .05mfd. @ 400V.
C8		Cap., Ceramic Disc, 20,000mmf. @500V.
C9		Cap., Ceramic Disc, 220mmf @ 500V.
C10		Cap., Molded Tub., .05mfd. @ 400V.
C11		Cap., Ceramic Disc, 68mmf. @ 500V.
C12		Cap., Ceramic Disc, 220mmf. @500V.
C13		Cap., Molded Tub., .05mfd. @ 400V.
C14		Cap., Ceramic Disc, 20,000mmf. @1000V.
C15		Cap., Ceramic Tub., 1500mmf. @500V.
C16		Cap., Molded Tub., .05mfd. @ 400V.
C17		Cap., Molded Tub., .05mfd. @ 400V.
C18		Cap., Molded Tub., .0015mfd. @600V.
C19		Cap., Molded Tub., .0015mfd. @600V.
C20		Cap., Ceramic Disc, 10,000mmf. @ 900V.
R1	31P124	Volume Cont. & On-off Sw., 250K
R2	31P125	Tone Cont. & Monitor On-off Sw., 50K
R3	31P095	Eye Adj. Control, 2Meg.
R4		Resistor, 1Meg., $\frac{1}{2}$ Watt
R5		Resistor, 4.7Meg., $\frac{1}{2}$ Watt
R6		Resistor, 15Ω, $\frac{1}{2}$ Watt
R7		Resistor, 150K, $\frac{1}{2}$ Watt
R8		Resistor, 3.3K, $\frac{1}{2}$ Watt
R9		Resistor, 33K, $\frac{1}{2}$ Watt
R10		Resistor, 220K, $\frac{1}{2}$ Watt
R11		Resistor, 2.2K, $\frac{1}{2}$ Watt
R12		Resistor, 12K, $\frac{1}{2}$ Watt
R13		Resistor, 470Ω, $\frac{1}{2}$ Watt
R14		Resistor, 150K, $\frac{1}{2}$ Watt
R15		Resistor, 1.8K, $\frac{1}{2}$ Watt
R16		Resistor, 150K, $\frac{1}{2}$ Watt
R17		Resistor, 470K, $\frac{1}{2}$ Watt
R18		Resistor, 2.2K, $\frac{1}{2}$ Watt
R19		Resistor, 15K, $\frac{1}{2}$ Watt
R20		Resistor, 100K, $\frac{1}{2}$ Watt
R21		Resistor, 470K, $\frac{1}{2}$ Watt
R22		Resistor, 470Ω, $\frac{1}{2}$ Watt
R23		Resistor, 270Ω, 2 Watt
R24		Resistor, 150K, $\frac{1}{2}$ Watt
R25		Resistor, 27K, $\frac{1}{2}$ Watt
R26		Resistor, 470K, $\frac{1}{2}$ Watt
R27		Resistor, 3.3Ω, 1 Watt
R28		Resistor, 3.3Meg, $\frac{1}{2}$ Watt
R29		Resistor, 560K, $\frac{1}{2}$ Watt
R30		Resistor, 1.8K, $\frac{1}{2}$ Watt
R31		Resistor, 220K, $\frac{1}{2}$ Watt
R32		Resistor, 10K, $\frac{1}{2}$ Watt
R33		Resistor, 4.7K, 2 Watt
R34		Resistor, 1000Ω, 5 Watt
K1	62P010	Couplate
T1	68P040	Power Transformer
T2	67P038	Output Transformer
L1	65P103	Oscillator Coil
SP1	76P036	Speaker, P.M., 5 x 7" Oval
M1	32X118	Record-Playback Switch
M2	32P070	Speed Equalization Switch
M3		Selenium Diode
M4		Input Jack
M5		Ext. Amp. Jack
M6		Output Jack

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	49P264*	Front Plastic Cover
2	26P1395	Screw
3	39P176	Knob
4	11X1763-1	Escutcheon Assembly
5	45P2292*	Top Plate
6	11X1747*	Shift Knob Assembly
7	46P290	Spring - Knob Retainer
8	49P224*	Knob
9	50P224	Spring Clip
10	11X654	Left Brake Shoe Assembly
11	11X1739*	Clutch & Brake Drum Ass'y., L.H.
12	11X1740*	Brake Drum & Bearing Ass'y.
13	46P472	Clutch Spring
14	45P1739	Clutch Housing Cover (Upper)
15	25P615	Clutch Disc
16	45P1812	Clutch Housing Cover (Lower)
17	11X1741	Clutch Housing & Bearing Ass'y.
18	25P613	Washer
19	25P614	Washer
20	50P301	Retaining Ring
21	25P370	Washer
22	11X1732	Left Reel Arm Ass'y.
23	50P125	Clip
24	25P046	Washer
25	11X1736	Fast Drive Ass'y.
26	72P008	Tire
27	72P007	Tire
28	50P224	Spring Clip
29	11X1734	Idler Arm Ass'y. (L.H.)
30	25P046	Washer
31	25P370	Washer
32	50P390	Push-on Clip
33	11X1795	Left Crank Arm Assembly
34	42X227*	Speed Change Cam
35	26P248	Screw
36	25P230	Washer
37	41P814	Shoulder Bushing
38	25P370	Washer
39	50P253	Retainer Ring
40	46P239	Compression Spring
41	11X1735	Speed Change Lever Ass'y.
42	46P477	Spring
43	46P476	Spring
44	50P224	Spring Clip
45	25P370	Washer
46	11X647	Idler Arm Ass'y. (R.H.)
47	50P125	Spring Clip
48	25P046	Fibre Washer
49	11X683	Wheel Ass'y.
50	11X1733	Right Crank Arm Ass'y.
51	46P470	Tension Spring
52	46P139	Tension Spring
53	11X653	Right Brake Shoe Ass'y.
54	11X1737	Brake Drum & Clutch Drive Wheel
54A	11X1738	Brake Drum & Bearing
54B	11X1717	Clutch Drive Wheel (R.H.)
	26P1451	Set Screw
55	11X1731	Right Reel Arm Ass'y.
56	50P125	Spring Clip
57	41P1641	Shoulder Bushing
58	11X1730	Cam Plate & Stud Ass'y.
59	50P224	Spring Clip
60	45P2354	Cam Plate
61	11X1705	Control Shaft Ass'y.
62	41P1103	Spacer
63	45P1132	Case Mount
64	26P1034	Screw W/Lockwasher
65	46P475	Tension Spring
66	11X1669	Head Bridge & Stud Ass'y. (Inc. items 67, 86, 87)
67	49P167	Tape Support
68	26P1421	Screw
69	45P2321	Spring Anchor Bracket
70	50P224	Spring Clip
71	25P183	Washer
72	25P371	Washer
73	11X673	Pressure Roller (Inc. items 70, 71, 72 & 74)
74	25P370	Washer
75	11X1745	Pressure Roller Arm Ass'y. (Inc. items 68, 69, 82, 83 & 84)
76	46P061	Spring
77	26P1451	Screw
78	11X817	Erase & Pressure Pad Ass'y.
79	26P1038	Screw
80	26P977	Screw
81	11X1746	Play-Record-Erase Head
82	50P224	Spring Clip
83	25P010	Washer
84	46P474	Spring
84A	46P187	Spring
85	11X1710	Cam & Hub Ass'y. (Inc. item 77)
86	45P1064	Control Link
87	11X695	Bell Crank & Stud Ass'y.
88	72P005	Belt
89	11X1722	Capstan Ass'y.
90	45P2313	Edit Slide
91	26P248	Screw
92	25P230	Washer
93	41P1641	Shoulder Bushing
94	26P1508	Screw
95	74P004	Counter
96	45P2315	Counter Support Bracket
97		Counter Mtg. Gasket
98	72P005	Belt
99	46P187	Spring
100		Retainer Ring
101		Lockwasher
102		Hex. Nut
103	45P1073	Tri-Brace
104	25P479	Washer
105	25P348	Split Lockwasher
106	26P331	Hex. Nut
107	26P450	Screw
108	11X662	Switch Crank Ass'y.
109	15X220	Motor - 117 Volts
110	25P551	Grommet
111	25P686	Washer
112	25P535	"C" Washer

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CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS

WESTINGHOUSE MODEL H-22T155 (Ch. V-2293-31)

TRADE NAME	Westinghouse	MODELS	CHASSIS
		H-22T155, H-22T156	V-2293-31
		H-22T157A	V-2293-11
MANUFACTURER	Westinghouse Electric Corp., Television & Radio Division, Metuchen, N. J.		
TYPE SET	Color Television Receiver		
TUBES	Twenty-nine		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING 360 Watts, 3.5 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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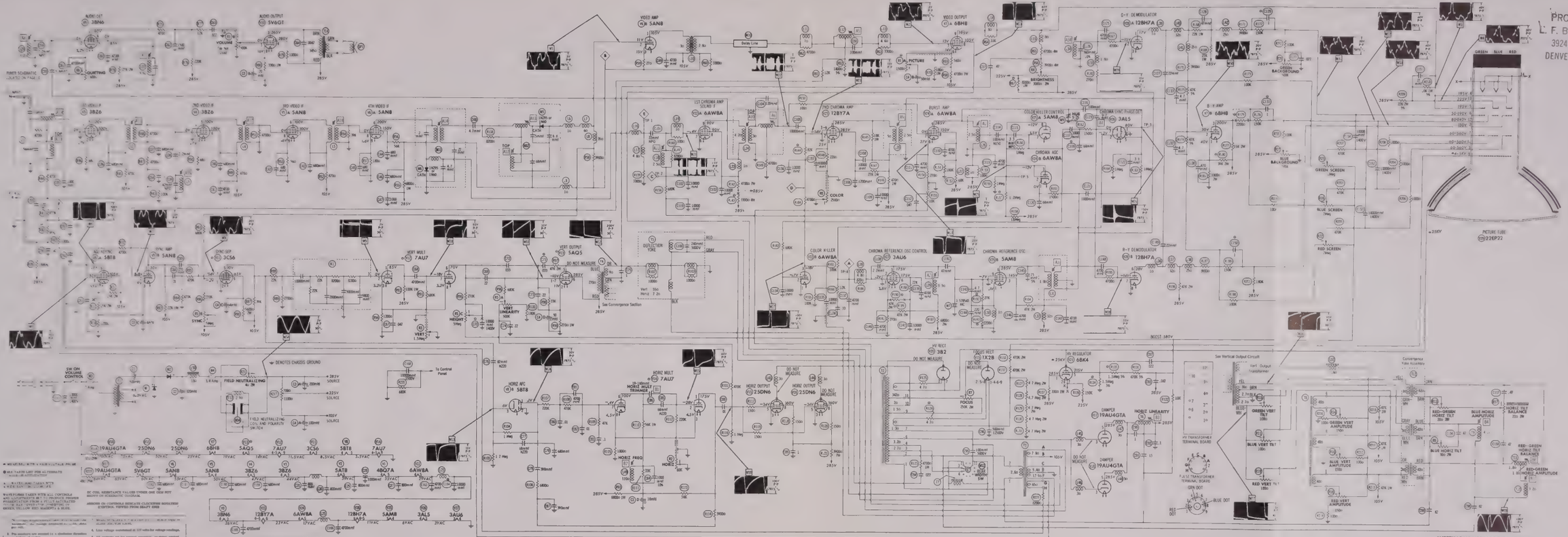
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3924 MEADE St.,
DENVER, COLORADO
WESTINGHOUSE MODELS H-22T155, H-22T156, H-22T157A (Ch. V-2293-11, -31)
WESTINGHOUSE MODELS H-22T155,
H-22T156, H-22T157A (Ch. V-2293-11, -31)
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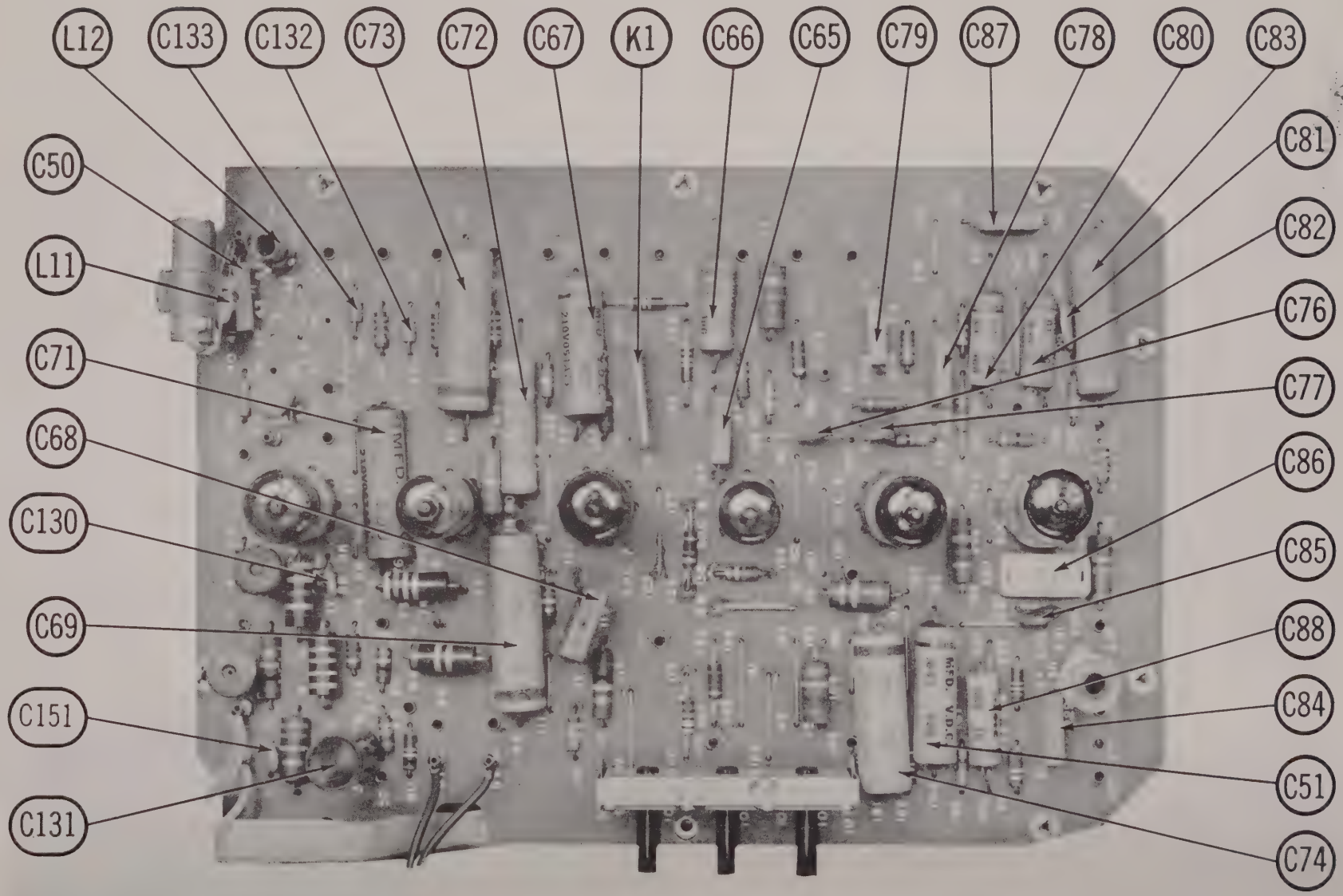
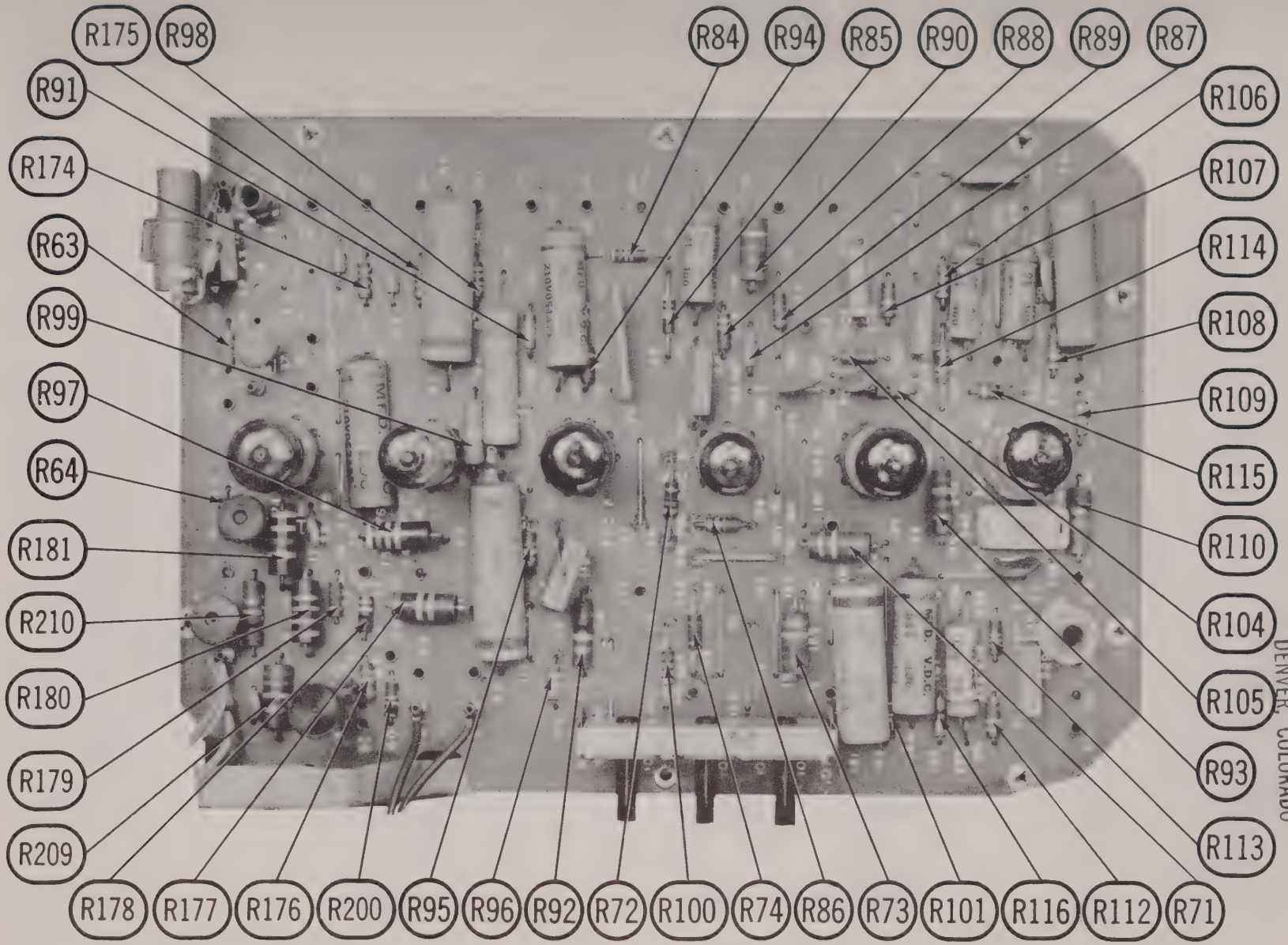
BLOCK DIAGRAM



PRINTED BOARD - CAPACITOR & INDUCTOR IDENT.



PRINTED BOARD - RESISTOR IDENT.

WESTINGHOUSE MODELS H-221155, H-221156, H-221157A (Ch. V-2293-11, -31)

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS - READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT

CHROMA REFERENCE OSCILLATOR ALIGNMENT

The signal generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 6AW8 (V24). Low side to chassis.	3.58MC (unmod)	Any unused channel.	DC probe thru 100K to pin 1 or pin 5 (cathode) of 3AL8 (V26) Common to chassis.	A1	Disable the crystal controlled oscillator by connecting a short clip lead from pin 3 (screen grid) of 5AM8 (V25) to chassis. Set bar adjustment at the center of its range. Adjust A1 for maximum positive deflection. Remove clip lead from V25.
2.	"	"	"	"	USE SCOPE Vert. amp. thru high impedance probe to pin 7 (grid) of 6AW8A (V22) Low side to chassis.	A2	Connect clip lead from point Ⓐ to chassis. Make rough adjustment of A3 for zero beat. Disconnect scope. Remove clip lead from point Ⓐ.
3.	"	"	"	"	Connect DC probe thru 100K to pin 7 (grid) of 12BH7A (V28). Common to chassis.	A3	Adjust for maximum deflection. Remove all test connection.
4.	"	"	Not used.	"	RF probe to pin 1 or pin 5 (cathode) of 3AL8 (V26). Common to chassis.	A4	Connect clip lead from pin 7 (grid) of 6AW8A (V24) to chassis. Adjust A4 for MINIMUM deflection.
5.	"	"	"	"	DC probe to point Ⓐ Common to chassis.	A2	Adjust for zero deflection. Remove clip lead from V24.

VIDEO ALIGNMENT

The signal generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.05MFD and 82K resistor in series.	High side to point Ⓓ. Low side to chassis.	3.58MC (400~30% AM Mod)	Any unused channel.	Vert. amp. to pin 9 (plate) of 6BH8A (V7), or red gun, pin 4 (cathode) of picture tube. Low side to chassis.	A5	Adjust for MINIMUM deflection. Disconnect test equipment.

CHROMA AND SOUND IF ALIGNMENT

Connect the negative lead of a 6 volt bias supply to point Ⓒ. Connect positive lead to chassis.
Connect a very short braided jumper from pin 8 (grid) of 6AN8 (V6) to chassis. Connect a clip lead from point Ⓔ to chassis.
Set the color control (R8) 3/4 turn from full counter clockwise.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to point Ⓒ. Low side to chassis.	Not Used.	4.5MC (400~30% AM Mod)	Any unused channel.	Vert. amp. thru detector probe to pin 4 (plate) of 12BY7A (V33). Low side to chassis.	A6	Connect a clip lead from pin 3 (grid) of V25 to chassis. Turn A6 fully clockwise (from top). Adjust A6 for MINIMUM 400% indication on scope. Remove clip lead from pin 3 of V25.
8.	"	"	4.5MC (400% Swp)	"	"	Vert. amp. to top of volume control. Low side to chassis.	A7, A8, R6	Preset volume control fully counter clockwise. With the input signal set to approximately 50000 microvolts adjust A7 for maximum FM response on scope. Reduce the input to 1000 microvolts or to a level just below the limiting level of the 5BH6. Adjust A8 for maximum FM response on scope. Increase signal level to 5000 microvolts or just above limiting level. Adjust the quieting control (R6) for MINIMUM AM response as indicated by equal AM ripple of AM modulation on positive and negative peaks of the FM demodulation curve. Remove the scope connection.
9.	L6K	Use Video Sweep Cpg. High side to point Ⓑ. Low side to chassis.	2.5MC (5MC Swp)	3.1MC 3.58MC 4.1MC	"	Vert. amp. thru high impedance probe to pin 3 (red grid) of picture tube. Low side to chassis.	A8, A10, A11	Adjust A9 for maximum amplitude at 3.58MC as shown in Fig. 1. Turn A10 fully counter clockwise then clockwise for maximum response at 3.1MC as shown in Fig. 1. Adjust A11 for maximum response at 4.1MC as shown in Fig. 1. Retouch A10 and A11 to touch up response curve. Connect the scope to pin 6 (green grid) of picture tube. The response curve should be the same as on the red grid but smaller in amplitude.

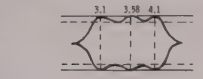

FIG 1

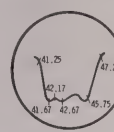

FIG. 2

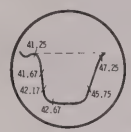

FIG 3

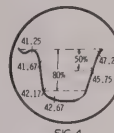

FIG 4

FIG 5

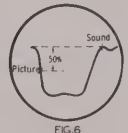

FIG.6

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	.05MFD	High side to pin 9 (grid) of 5AN8 (V5) Low side to chassis.	43.5MC (10MC Swp)	41.25MC 41.67MC 42.17MC 42.67MC 45.75MC 47.25MC	Any unused channel.	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A12, A13, A14	Turn A12 fully counter clockwise (from top) then clockwise until "kick-up" produced in response curve is toned out of the low frequency end of bandpass. Turn A13 fully clockwise (from top). Adjust A14 for a peak in the response curve at 43.9MC. Adjust A13 to shift peak to 43.67MC (see Fig. 2). Adjust A12 to 41.67MC.
11.	"	"	"	"	"	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A13	Adjust A13 to place 41.25MC in sound trap notch as in Fig. 3.
12.	"	"	"	"	"	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A13, A14	Retouch A14 for response similar to Fig. 2. (A14 rocks response curve.) Adjust A14 for equal peaks. If the 43.67MC marker does not fall within 5.7% of peak then retouch A13 until the response curve is similar to Fig. 2.
13.	"	"	"	"	"	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A13	Repeat step 11 if necessary to obtain response similar to Fig. 3.
14.	"	"	"	"	"	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A14	Retouch A14 if necessary to obtain response similar to Fig. 2.
15.	"	"	Not Used.	41.25MC (400~30% AM Mod)	"	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A13	Retouch A13 if necessary for MINIMUM indication on scope.
16.	"	High side to pin 1 (grid) of 5BZ6 (V3). Low side to chassis.	43.5MC (10MC Swp)	41.25MC 41.67MC 42.17MC 42.67MC 45.75MC 47.25MC	Any unused channel.	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A15, A16, A17, A18	Connect negative lead of a 15 volt bias supply to point Ⓕ. Positive to chassis. Adjust A15 to approximately 45.75MC. Adjust A16 for MINIMUM indication at 47.25MC. Tune AM to approximately 41MC. Adjust A18 to approximately 43MC. Retouch A1 until 45.75MC marker is located at 50% on curve as in Fig. 6. If necessary, retouch A18 to flatten top of response curve.
17.	"	"	"	"	"	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A17	If necessary, retouch A17 for response curve similar to Fig. 5.
18.	"	"	"	"	"	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A18	If necessary, retouch A18 for flat top response.
19.	Direct	High side to an ungrounded tube shield floating over mixer-osc. tube (V2). Low side to chassis.	"	41.25MC 42.5MC 45.75MC	"	Vert. amp. thru 10K to point Ⓓ. Low side to chassis.	A18, A30, A31	Adjust A18 to 45.75MC and A30 for MINIMUM at 41.25MC. Adjust A31 to 42.5MC.
20.	"	"	Not Used.	41.25MC (400~30% AM Mod.)	"	"	A19	Readjust A18 for MINIMUM indication on scope.
21.	"	"	"	47.25MC (400~30% AM Mod	"	"	A18	Retouch A18 for MINIMUM indication on scope.

OSCILLATOR ALIGNMENT

Connect the negative lead of a 15 volt bias supply to point Ⓕ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the center of its range.
Use only enough sweep generator output to provide usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 47K to point Ⓓ. Low side to chassis.	A22	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should fall at 50%. A23, A24, A25, A26, A27, A28, A29 and A33 are adjusted by bending coil inpreneers.
			207MC (10MC Swp)	205.75MC 209.75MC	12		A23	
			201MC (10MC Swp)	199.75MC 203.75MC	11		A24	
			195MC (10MC Swp)	193.75MC 197.75MC	10		A25	
			189MC (10MC Swp)	187.75MC 191.75MC	9		A26	
			183MC (10MC Swp)	181.75MC 185.75MC	8		A27	
			177MC (10MC Swp)	175.75MC 179.75MC	7		A28	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A29	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A30	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A31	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A32	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A33	

RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

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MISCELLANEOUS ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Connect a short clip lead across the horizontal frequency coil (L49). This can be done on top of the chassis.

2. Set the horizontal control (R2) to the center of its range and leave it in this position through the following steps.

3. Connect the DC probe of the VTVM to pin 7 (grid) of the horizontal multivibrator (V14) and the common lead to chassis.

4. With the receiver tuned to a TV station, adjust the horizontal multivibrator trimmer (B1) for zero reading on the VTVM. If zero can be approached but not reached at one extreme of B1, it may be necessary to set the horizontal control SLIGHTLY to one side of mid-range to obtain zero reading on the VTVM.

5. Remove the clip lead from L49.

6. Adjust the horizontal frequency slug (B2) for zero reading on the meter and check the adjustment by switching off channel and back again. The receiver should pull into horizontal synchronization on all channels. If not, repeat adjustments.

7. Set the horizontal width switch for a picture SLIGHTLY wider than necessary to fill the picture mask horizontally.

8. Adjust the horizontal linearity slug (B3) for best horizontal linearity.

PURITY ADJUSTMENTS

The receiver should be oriented and located in the position in which it is to be used before proceeding with the purity adjustments.

1. Preset the deflection yoke all the way to the rear of its range and set the two centering arms together in an upright position.

2. Make sure the convergence coil is properly positioned with each coil over its respective gun.

3. Turn the field neutralizing control (R21) fully counter clockwise.

4. Pull all the equalizing edge magnets all the way out from the edge of the tube.

5. Set the following controls and adjustments to the center of their range: blue horiz. amp. (B4), blue horiz. tilt (R9), red-green horiz. amp. (B5), red-green horiz. tilt balance (B6), red-green horiz. tilt balance control (R17), blue vert. tilt control (R11), green vert. tilt control (R15) and red vert. tilt control (R19).

6. Set the following controls fully counter clockwise: red-green horiz. tilt control (R13), blue vert. amp. control (R10), green vert. amp. control (R14) and red vert. amp. control (R18).

7. Set the red tabs of purity magnets together.

8. Adjust convergence magnets and the blue beam positioning magnet for best convergence at the center of the screen.

9. Turn the blue and green screen and background controls fully counter-clockwise. (Note: The red screen control has been preset at the factory and no adjustment should be attempted by the service man except as outlined under "Gray Scale Adjustments".) Turn the picture control (R1A) to MINIMUM. Adjust the brightness for a suitable raster.

10. Adjust the purity magnets for red purity in an area centered approximately 3/4 inch away from the center of the screen toward the lower left hand corner. Adjust the field neutralizing control (R21) and polarity switch (M14) so that the blue region to the left of the red area and the green region to the right of the red area are in a horizontal line.

11. Move the deflection yoke forward until best red purity is obtained over the entire raster. Continue moving the yoke forward until contamination begins to appear in the picture, then back up, and center the yoke in the range which gives the best purity over the entire screen. SLIGHT readjustment of the purity magnet may be necessary. Check to be sure that both tabs of the purity magnet may be moved SLIGHTLY without disturbing the purity.

12. Adjust the field neutralizing control and polarity switch to center in the range which gives the best purity around the edges of the screen.

13. Turn the brightness control fully counter clockwise and increase the green screen and background controls and check the green raster for purity. Repeat for a blue raster. If necessary, compromise for best red, green and blue purity with the purity magnets and the neutralizing control.

14. Adjust the brightness control, blue and green screen and background controls until the raster is approximately white; do not bloom the raster. Observe the purity and if deemed necessary, readjust the purity magnets to center in the range which gives best white.

15. If necessary, adjust the equalizer edge magnets to compensate for any edge impurities. (Note: Additional clip on magnets Westinghouse part #498V008M01 may be added on the equalizer if needed. This may be done without removing the chassis by removing the safety glass and mask.)

CONVERGENCE

A. HORIZONTAL

1. Connect a crosshatch pattern generator and adjust the convergence and blue lateral magnet for convergence at the center of the screen. Be sure that the centering and linearity are set before starting the dynamic convergence adjustments.

2. Decrease the blue screen and background controls until the blue lines disappear.

3. Observe the center horizontal red and green lines. Adjust the red-green horizontal tilt balance (R17) for equal displacement of the red and green lines at the right and left sides of the screen, the red lines being either above or below the green line at both edges.

4. Adjust the red-green horizontal amp. balance (B6) until the red line and the green line are parallel.

5. Repeat step 3 and 4 if necessary.

6. Observe the vertical red and green lines where they intersect the horizontal red and green lines at the middle of the screen. Adjust the red-green horizontal tilt control (R13) for equal displacement between the red and green vertical lines at the right and left sides of the screen, the red line being either to the left of the green lines at both edges of the screen or to the right of the green line at both edges of the screen.

7. Adjust the red-green horizontal amp. (B5) until there is equal displacement between the red and green vertical lines across the entire middle portion of the screen from left to right.

8. Repeat steps 6 and 7 if necessary.

9. Increase the blue screen and background until the blue lines appear.

10. Observe the horizontal blue line in the middle of the screen. Adjust the blue horizontal tilt control (R9) for equal displacement between the blue line and the red and green lines at the right and left edges of the screen. The blue line being either above the red and green lines or below the red and green lines.

11. Adjust the blue horizontal amp. (B4) until the blue horizontal line is parallel to the red and green lines.

12. Repeat steps 10 and 11 if necessary.

13. Adjust the convergence magnets and the blue lateral magnet for convergence at the center of the screen.

B. VERTICAL

1. Decrease the brightness and picture controls until the red lines disappear. Adjust the blue and green screen and background control for suitable blue and green lines.

2. Observe a vertical green line in the middle of the screen. Adjust the green vertical tilt control (R15) for equal displacement between the green and blue vertical lines at the top and bottom of the screen, the green line being on the same side of the blue line at the top and bottom of the screen.

3. Adjust the green vertical amp. control (R14) until the green line is parallel to the blue line.

4. Repeat steps 2 and 3 if necessary.

5. Increase the brightness and picture controls until the red line is visible. Decrease the green screen and background controls until the green lines disappear.

6. Repeat steps 2, 3 and 4 for the red gun.

7. Adjust the blue vertical tilt control (R11) for equal displacement between the blue and red vertical lines at the top and bottom of the screen, the blue line being to the right or left of the red at both edges.

8. Adjust the blue vertical amp. control (R10) for equal displacement of the red and blue vertical lines from top to bottom of the screen, all the blue lines being to the right or left of the red lines.

9. Repeat steps 7 and 8 if necessary.

10. Increase the green screen and background controls until the green lines appear.

11. Adjust the convergence magnets and the blue lateral magnet for convergence at the center of the screen. Touch up the horizontal and vertical convergence if necessary.

COLOR PHASING

Connect a color bar generator across the antenna terminals. If the generator has a sound carrier, adjust the fine tuning so that the sound carrier is trapped out.

Connect the vertical amp. of the scope to pin 2 (red grid) of the picture tube. Connect the low side to chassis.

Set the color control (R8) 3/4 turn from full counter clockwise. Set the hue adjustment (M9) to the center of its range.

Adjust A1 for the R-Y waveform shown in Fig. 7.

Move the scope connection to pin 12 (blue grid) of the picture tube.

Adjust A34 for the B-Y waveform shown in Fig. 7. Be sure to adjust for correct amplitude of the magenta and cyan bars.

Connect the scope to pin 6 (green grid) of the picture tube and check for the G-Y waveform shown in Fig. 7.

MISCELLANEOUS ADJUSTMENTS (cont.)

GRAY SCALE ADJUSTMENTS

The red screen has been preset at the factory and under normal conditions should not be touched. However, if the picture tube or components effecting the red gun aperture setting are replaced, the red screen should be adjusted before proceding with the adjustment of the blue and green screen and background controls.

To adjust the red screen, turn the set to a clear channel and turn the blue and green screen controls fully counter clockwise. Connect a 1000 ohm resistor from either end of the delay line to chassis. (This sets the DC level on the grid of the second video amplifier. Connect the negative side of a 4MFD capacitor to pin 4 (cathode) of the picture tube. Connect the other end to chassis. (This removes the horizontal and vertical blanking pulses, video and noise which would effect the average DC voltage.)

Set the VTVM to the 100 volt scale. Connect the negative side of the meter to pin 2 (red grid) of the picture tube or to the red wire on the chroma printed board. Connect the positive side of the meter to pin 4 (red cathode) of the picture tube. (If the meter has a metal case it should be placed on an insulated pad or plate and not touched.) Adjust the brightness control for 65 volts reading. Observe the screen and adjust the red screen control (R22) until the raster is just cut off. Remove the resistor and capacitor. DO NOT RETOUCH THE RED SCREEN. Make sure that no light falls on the face of the picture tube because black and white balance cannot be adjusted under high ambient light conditions. Set the channel selector to an air signal. Set the brightness and picture controls for a low brightness and low contrast red raster. Advance the green screen control (R23) 3/4 turn from full counter clockwise. Advance the green background control (R20) until the low brightness areas of the picture are a dull yellow. Increase the brightness level without causing the picture to bloom and become defocused. If the raster color changes toward orange at high brightness, decrease the green screen control (R23) SLIGHTLY and readjust the green background control (R20) for yellow at low levels. Reduce the brightness and check tracking. That is, the picture remains yellow as the brightness is varied. Repeat until good tracking is obtained.

If the raster changes toward green at high brightness, increase the green screen control (R23) and readjust the green background control (R20) for yellow at low levels. Reduce the brightness and check for good tracking. Repeat until the tracking is correct.

Advance the blue screen control (R16) 3/4 turn from full counter clockwise. Adjust the blue background control (R12) until the low levels are gray. Increase the brightness but do not cause the picture to bloom. If the raster changes toward yellowish whites at high brightness, decrease the blue screen control (R16) and readjust the blue background control (R12) for gray at low levels. Reduce the brightness and check for tracking. Repeat until tracking is correct. If the raster color changes toward bluish white at high brightness, increase the blue screen control (R16) and readjust the blue background control (R12) for gray at low levels. Reduce the brightness and check for tracking. Repeat until tracking is correct.

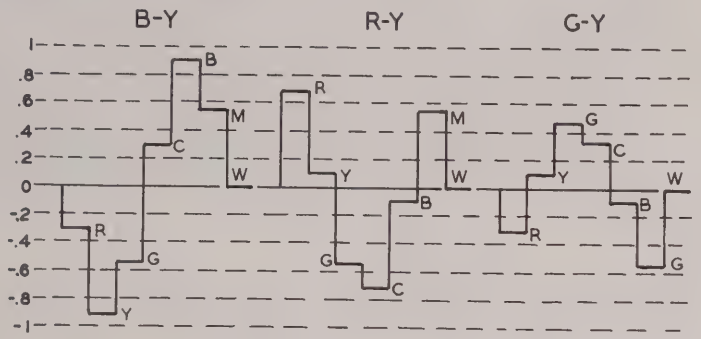
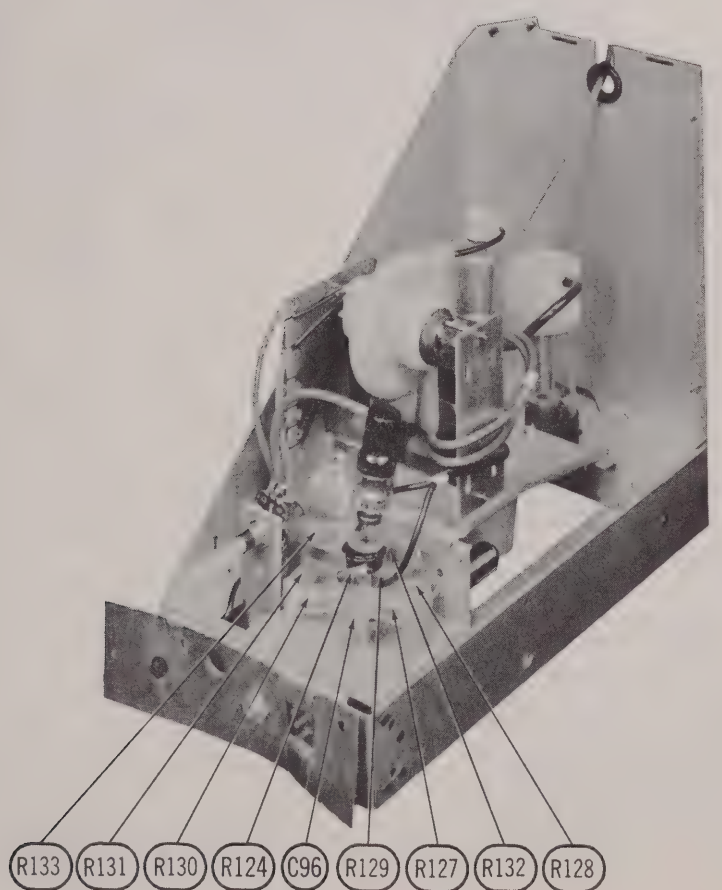
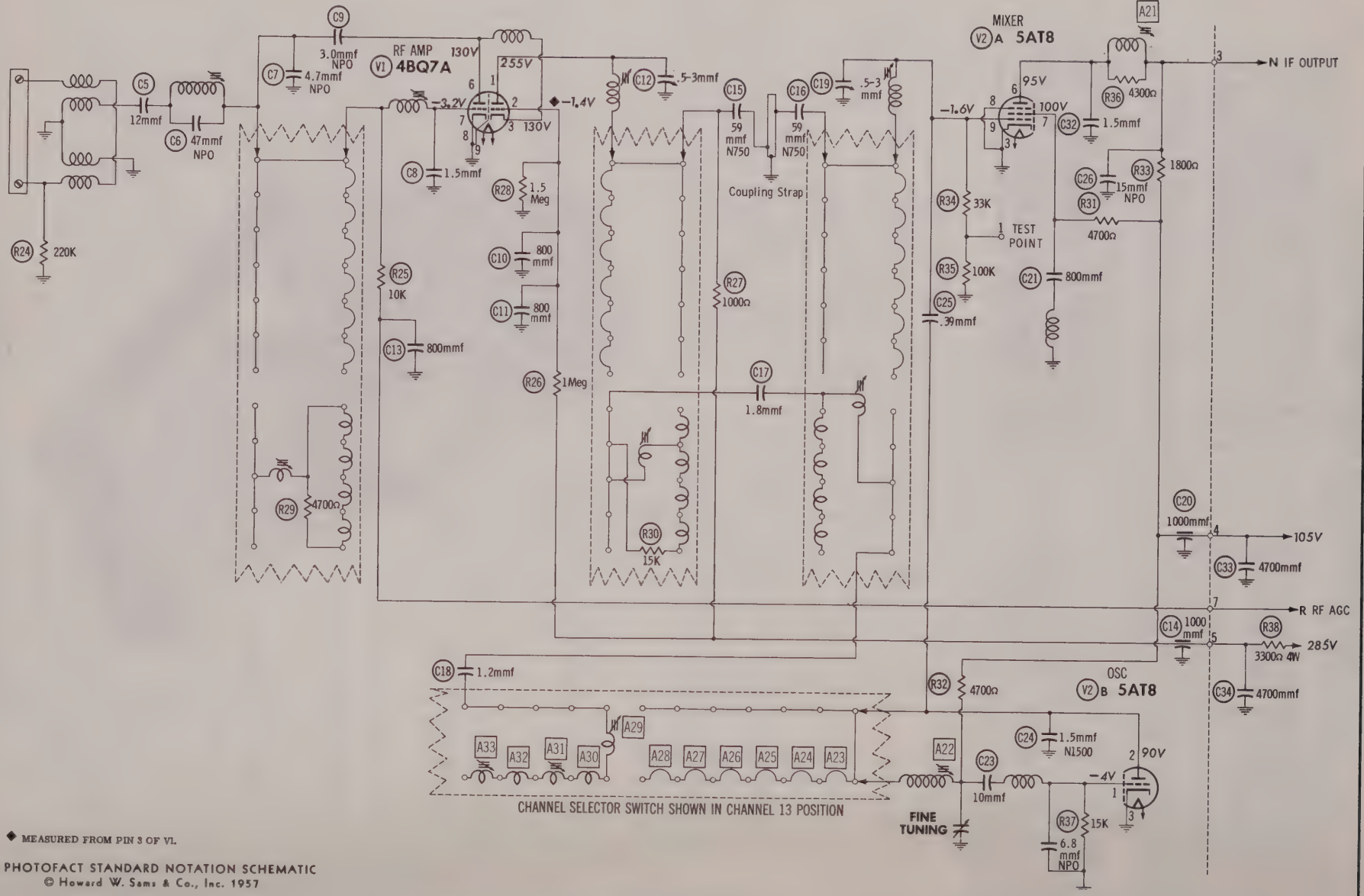


FIG. 7



HIGH VOLTAGE COMPARTMENT



◆ MEASURED FROM PIN 3 OF V1.

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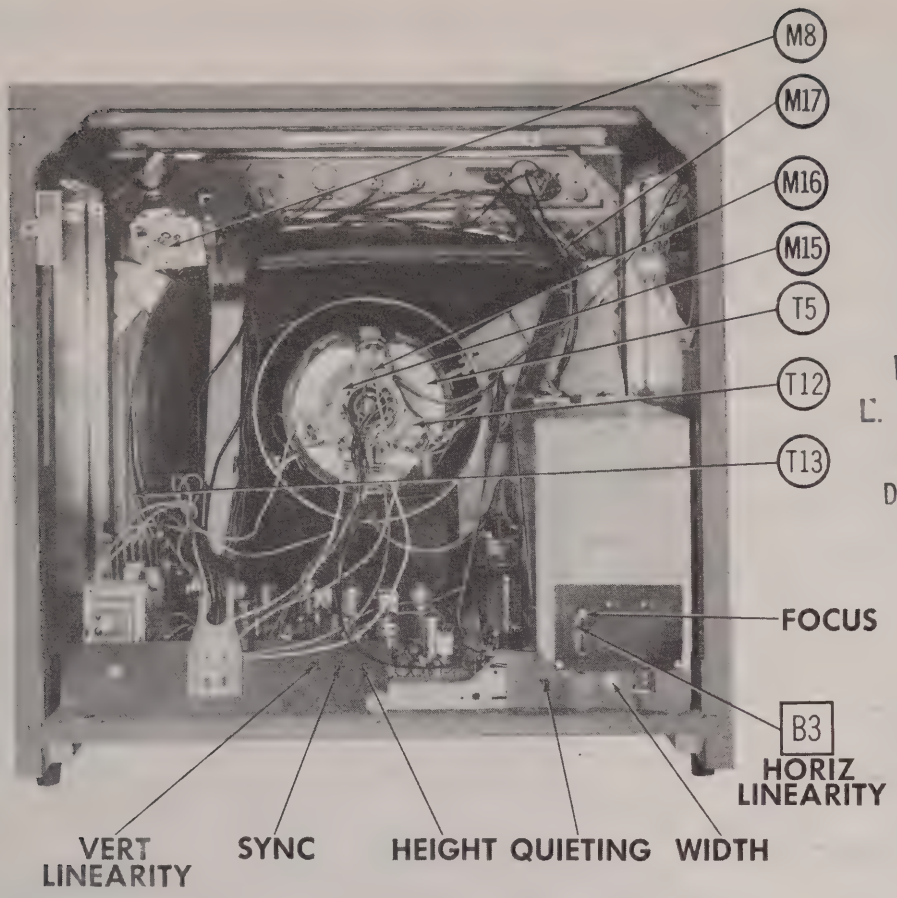
TUNER SCHEMATIC



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CABINET—REAR VIEW

DISASSEMBLY INSTRUCTIONS

SAFETY GLASS CLEANING

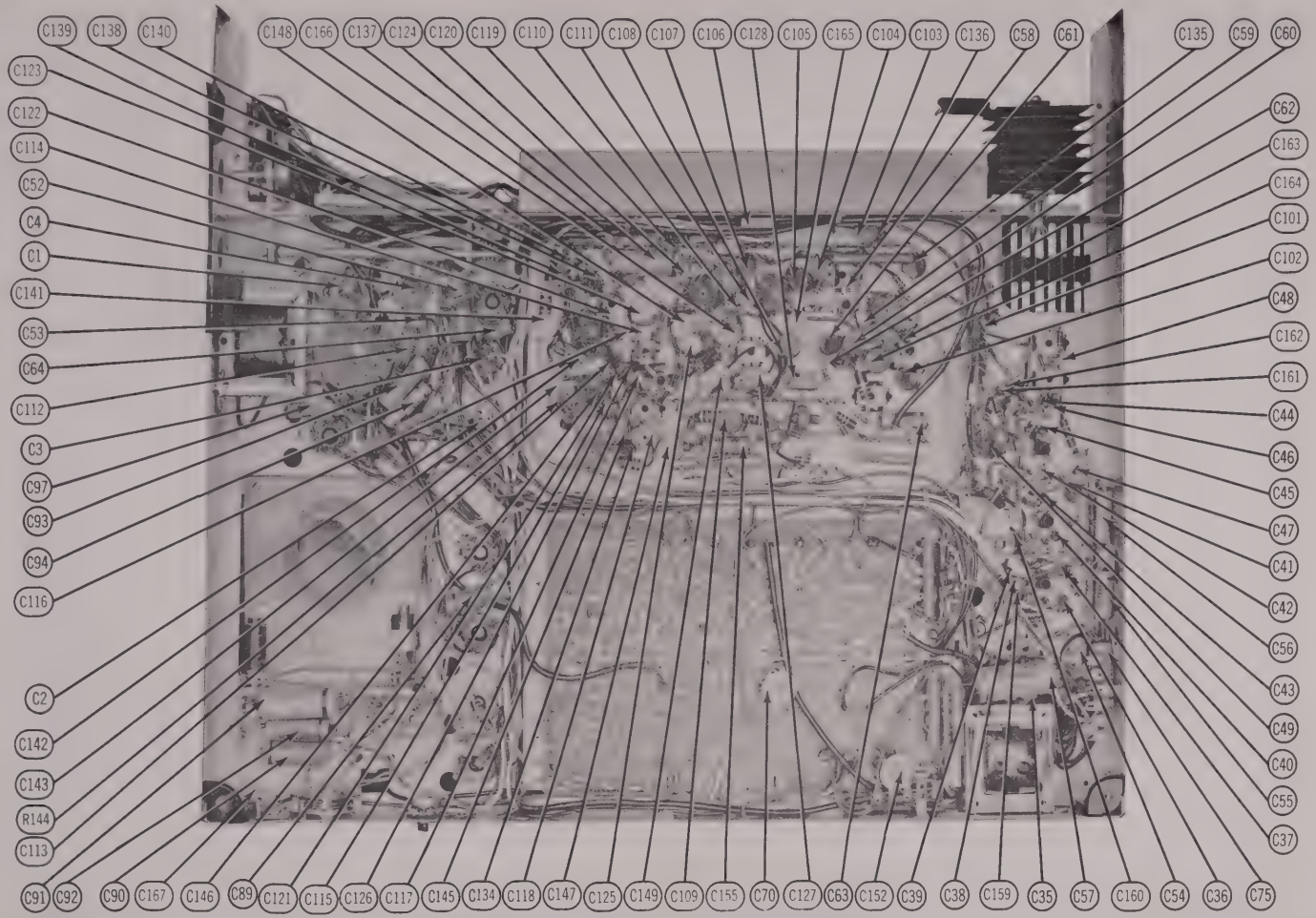
1. Remove 7 push-on type control knobs from front.
2. Remove 2 metal screws and escutcheon.
3. Remove 2 metal screws, one holding each side of metal trim and remove trim.
4. Remove 3 metal screws holding trim across top of safety glass.
5. Using extreme caution, remove safety glass.

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from the front and remove 2 from the side.
2. Remove 2 metal screws and escutcheon.
3. Remove 3 metal screws holding control bracket to the cabinet.
4. Remove 9 wood screws and the rear cover.
5. Remove 2 speaker leads, 2 speaker nuts and speaker.
6. Remove 2 hex nuts holding picture tube strap to the front of the cabinet.
7. Remove 2 wood screws holding antenna terminal board.
8. Remove 6 chassis bolts from bottom of cabinet.
9. Remove chassis.

PICTURE TUBE REMOVAL

1. Remove CRT socket.
2. Remove the blue beam corrector assembly.
3. Remove the purity magnet assembly.
4. Remove the convergence yoke assembly by loosening the wing nut on the bottom side of the assembly and spreading the arms SLIGHTLY until the plastic assembly is free from the CRT neck.
5. Remove the deflection yoke from its housing by unscrewing the two wing screws which hold it secure.
6. Remove white HV shield by removing strap securing this shield to chassis. To do this, loosen front hex screw on side control panel and unsolder strap from chassis.
7. Discharge the CRT high voltage by connecting a jumper from chassis to the CRT high voltage connector.
8. Disconnect the high voltage clip from the picture tube.
9. Remove the two metal screws which secure the control panel to the upper part of the equalizer assembly.
10. Remove the two screws that secure the dial lamp housing to the control panel.
11. Pull the control panel forward and over the tuner and dial shafts. Lay the panel on the support struts with the control shafts up.
12. Unsolder the yellow and black wires from the field neutralizing coil.
13. Remove the four metal screws (two on each side of the chassis) which secure the lower equalizer assembly to the chassis rails.
14. Steady the picture tube with one hand. Remove the four metal screws which secure the upper equalizer assembly to the support struts.
15. Pull the picture tube and mounting assembly forward and away from the chassis. Place face down on soft padding.
16. Remove the three tie rod nuts from the yoke housing.
17. Remove the yoke housing from the picture tube. A SLIGHT tap may be necessary to free the yoke housing.
18. Loosen or remove the two hex head machine screws which clamp the picture tube between the upper and lower equalizer assemblies.
19. Remove the equalizer assemblies and the cloth tape from around the picture tube.



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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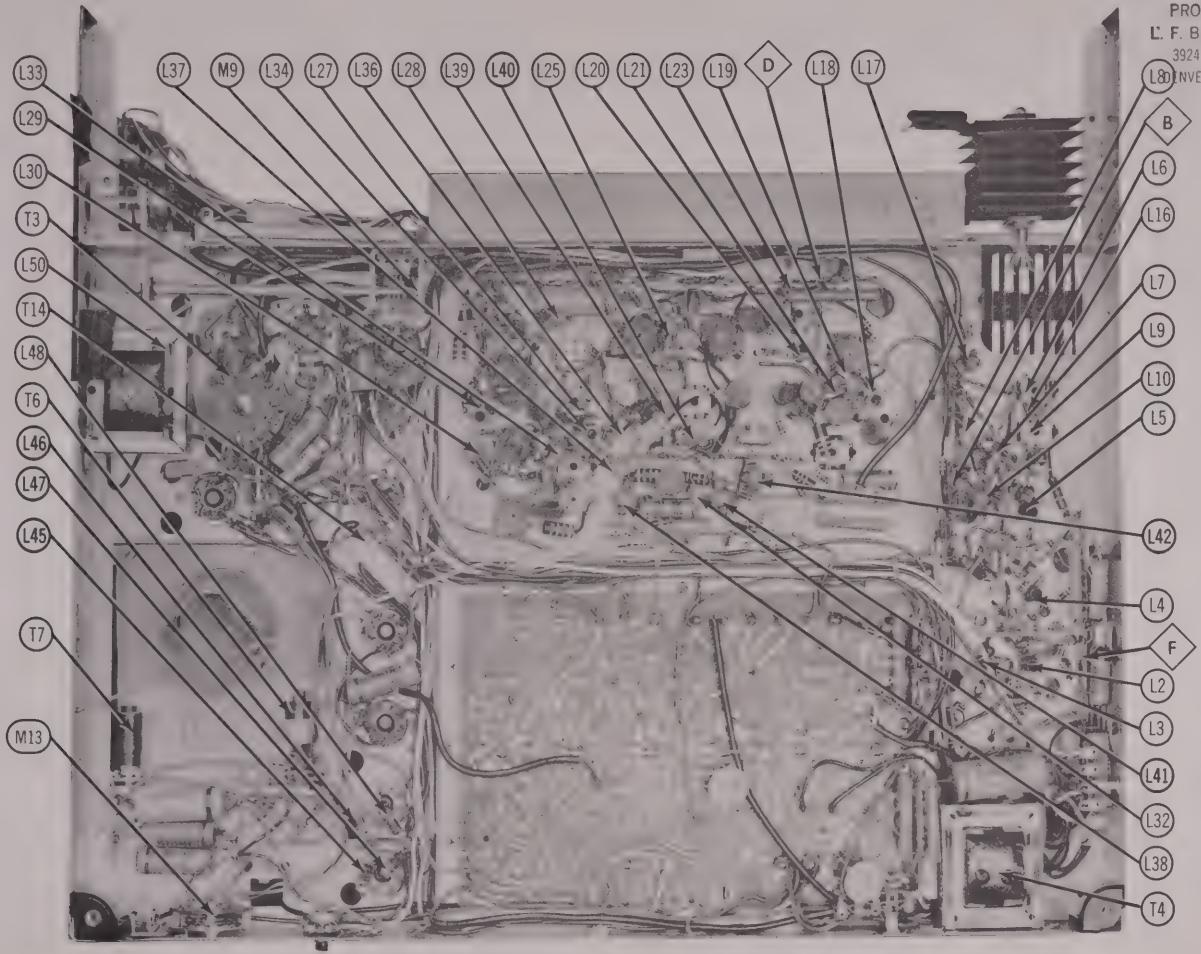
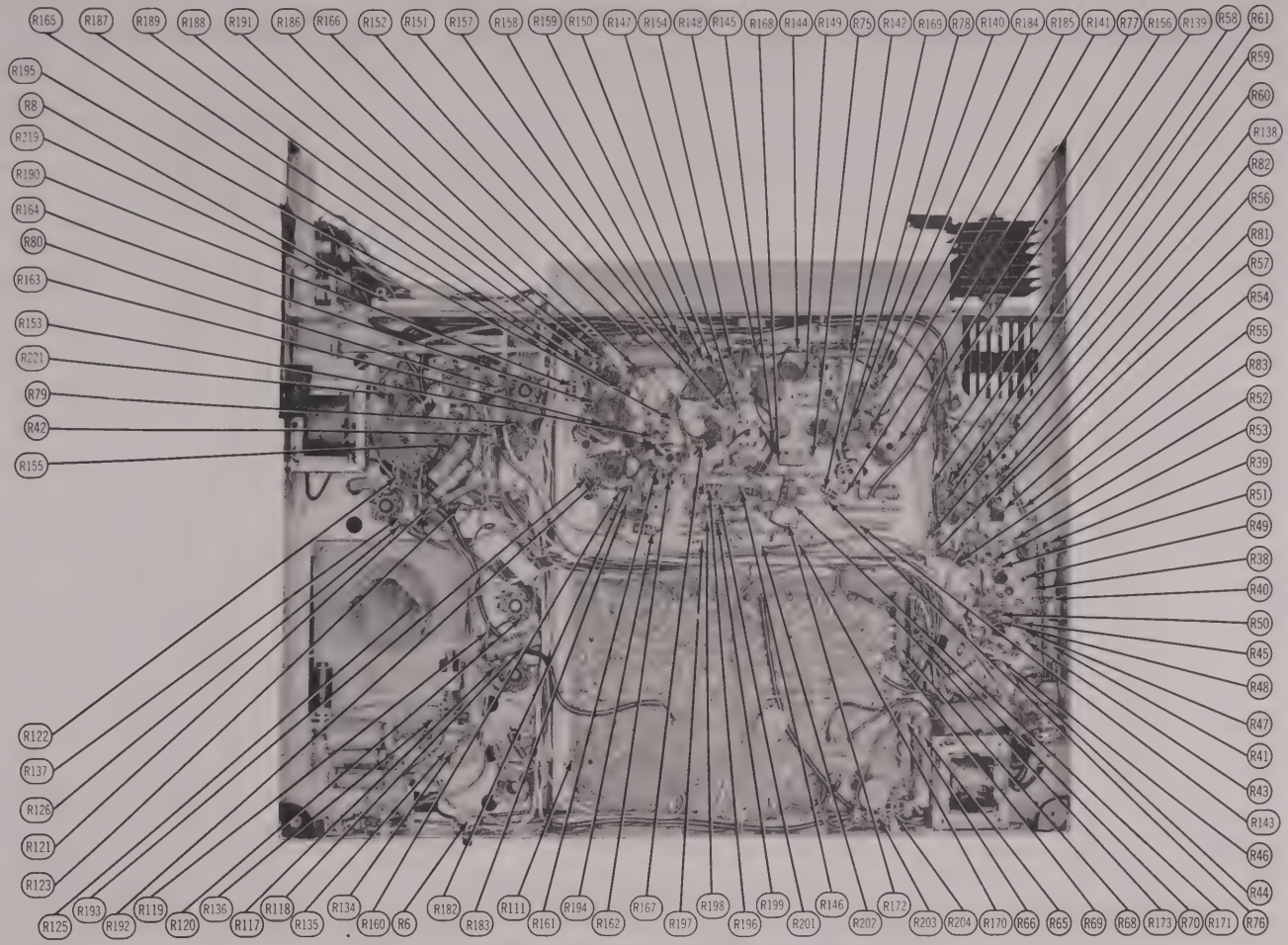


CHASSIS BOTTOM VIEW-, INDUCTOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	4BQ7A	†4500Ω	600K	INF	9Ω	8Ω	INF	2.2Meg	0Ω	0Ω
V2	5AT8	15K	†6500Ω	0Ω	9.5Ω	9Ω	†3000Ω	†6500Ω	0Ω	130K
V3	3BZ6	100K	68Ω	9.5Ω	10Ω	†2300Ω	†2300Ω	0Ω		
V4	3BZ6	100K	68Ω	10Ω	10.5Ω	†2300Ω	†2300Ω	0Ω		
V5	5AN8	†24K	14K	1200Ω	10.5Ω	11.5Ω	†2300Ω	†2300Ω	.1Ω	56Ω
V6	5AN8	†1800Ω	4800Ω	1300Ω	11.5Ω	12.5Ω	†6800Ω	†63K	.1Ω	180Ω
V7	6BH8	3300Ω	†45K	†15K	4.5Ω	5.5Ω	●700Ω	1800Ω	†1800Ω	●†8700Ω
V8	5BT8	2.2Meg	0Ω	1.2Meg	2Ω	.1Ω	530K	†1800Ω	†27K	†9000Ω
V9	3BN6	●380Ω	3.2Ω	6.5Ω	7Ω	†27K	3.5Ω	†220K		
V10	5V6GT	NC	12.5Ω	†360Ω	†1000Ω	●500K	NC	13.5Ω	330Ω	
V11	3CS6	●400K	0Ω	2Ω	2.5Ω	†16K	†7000Ω	950K		
V12	7AU7	†100K	55K	1200Ω	3.5Ω	3.5Ω	‡3Meg	●1.2Meg	1200Ω	2.5Ω
V13	5AQ5	●1Meg	270Ω	4.5Ω	3.5Ω	†250Ω	†18Ω	●1Meg		
V14	7AU7	†63K	●240K	1000Ω	1Ω	1Ω	†63K	3Meg	1000Ω	0Ω
V15	25DN6	NC	9.5Ω	0Ω	TP	500K	NC	13Ω	†3900Ω	TOP CAP 8Ω
V16	25DN6	TP	9.5Ω	0Ω	NC	500K	NC	5.5Ω	†3900Ω	TOP CAP 8Ω
V17	19AU4GTA	NC	NC	500K	NC	†23Ω	NC	16Ω	13.5Ω	
V18	19AU4GTA	NC	NC	500K	NC	†23Ω	NC	15Ω	13Ω	
V19	1X2B	23Meg	23Meg	NC	23Meg	23Meg	23Meg	NC	23Meg	23Meg
V20	3B2	PINS 1 THRU 9 HAVE INFINITE RESISTANCE								TOP CAP ‡350Ω
V21	6BK4	†330Ω	†150K	NC	NC	†900K	NC	†150K	NC	TOP CAP INF
V22	6AW8A	0Ω	2.7Meg	100K	8Ω	7Ω	0Ω	2.4Meg	†8000Ω	†8000Ω
V23	12BY7A	●1300Ω	180K	0Ω	6.5Ω	6.5Ω	5.5Ω	†500Ω	†27K	0Ω
V24	6AW8A	1500Ω	1Meg	1Meg	5.5Ω	4Ω	10K	100Ω	†35K	†21Ω
V25	5AM8	1Ω	27K	†47K	1.5Ω	3Ω	†50Ω	2Meg	1Meg	0Ω
V26	3AL5	1Meg	2Meg	1.5Ω	1Ω	1Meg	0Ω	.3Ω		
V27	3AU6	2Meg	0Ω	1Ω	0Ω	†6800Ω	†29K	270Ω		
V28	12BH7A	†30K	4700Ω	0Ω	3Ω	3Ω	†30K	4700Ω	0Ω	4Ω
V29	22EP22	†150K	●90K	●‡600K	†7200Ω	†7200Ω	●100K	●‡800K	NC	25Meg
		Pin 10 NC	Pin 11 ●‡850K	Pin 12 100K	Pin 13 †12K	Pin 14 †150K				

† MEASURED FROM OUTPUT OF M2.
‡ MEASURED FROM PIN 3 OF V18.
● THIS READING WILL VARY, CONTROL SET FOR NORMAL OPERATION.
NC NO CONNECTION
TP TIE POINT

TUBE PLACEMENT CHART

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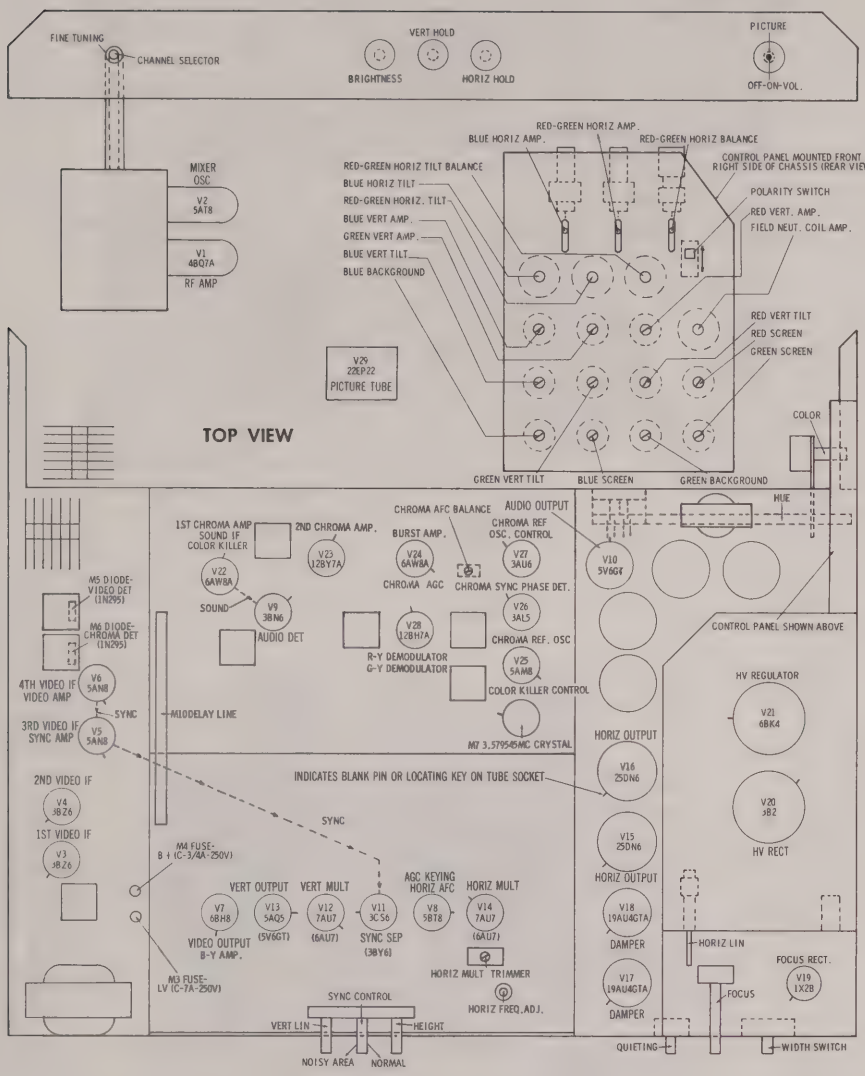
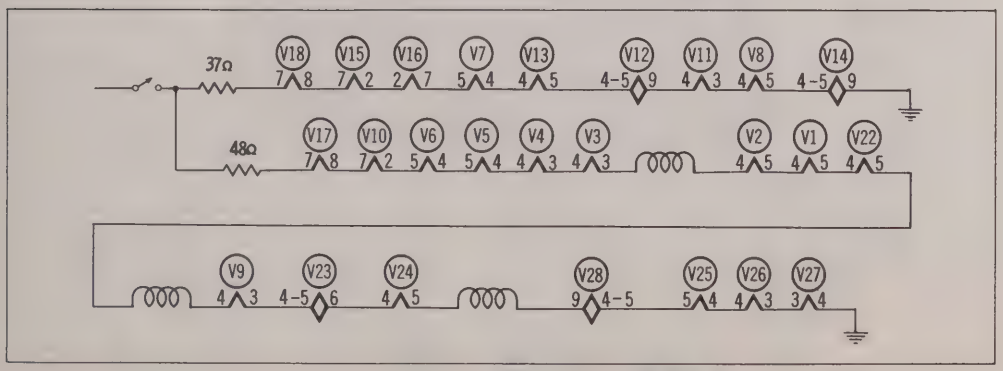
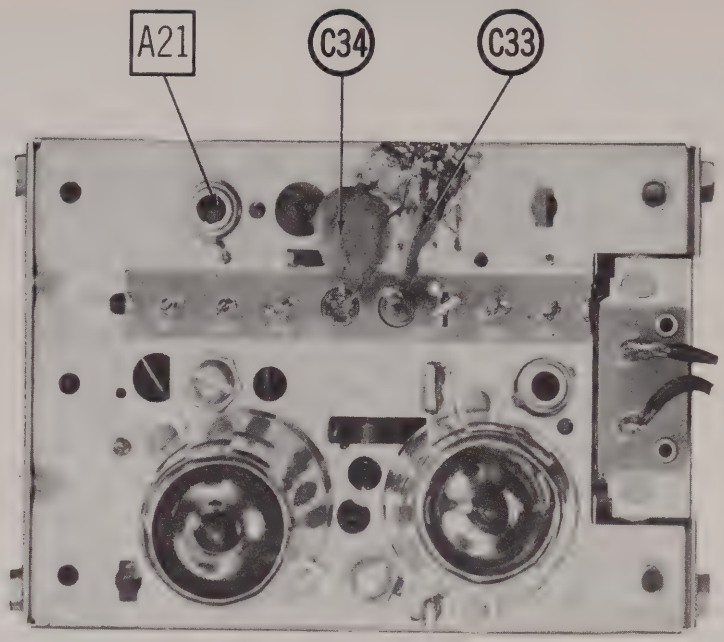
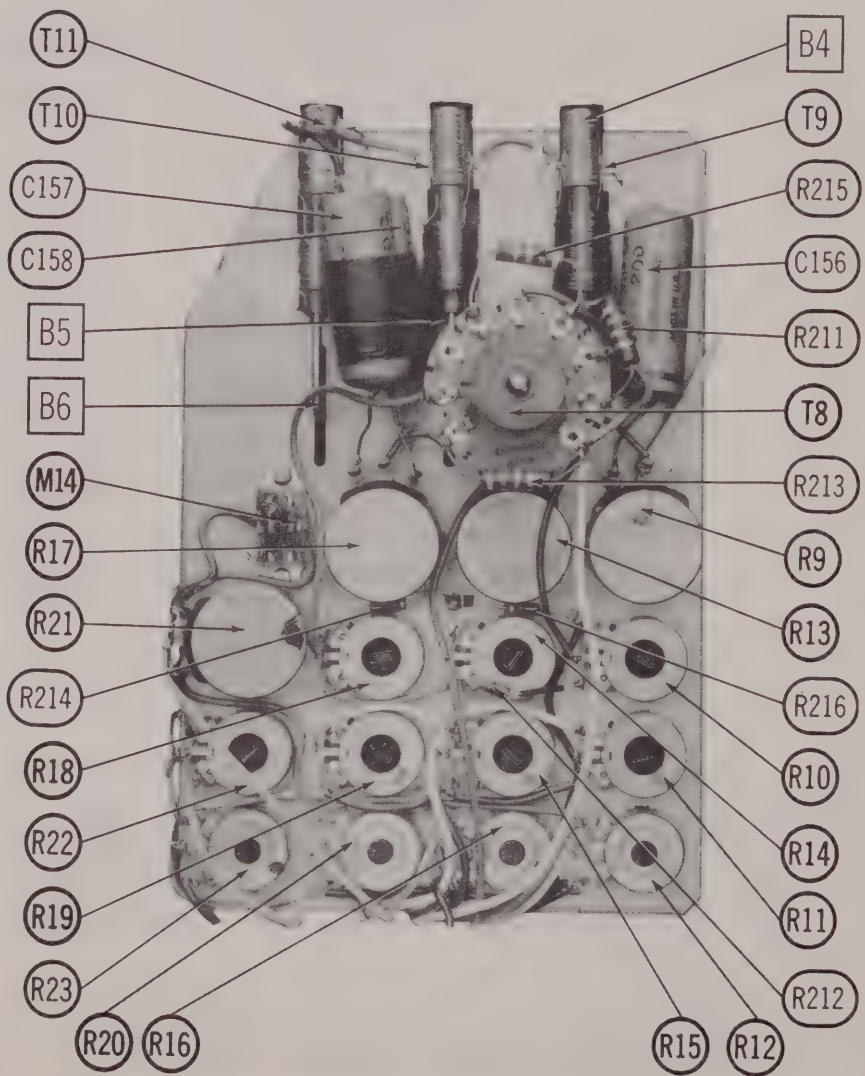




SET 357 FOLDER 12



RF TUNER - TOP VIEW



CONTROL PANEL

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amp.	4BQ7A	
V2	Mixer-Osc.	5AT8	
V3	1st Video IF Amp.	3BZ6	
V4	2nd Video IF Amp.	3BZ6	
V5	3rd Video IF-Sync Amp.	5AN8	
V6	4th Video IF Amp. - Video Amp.	5AN8	
V7	Video Output-B-Y Amp.	6BH8	
V8	AGC Keying-Horiz. AFC	5BT8	
V9	Audio Det.	3BN6	
V10	Audio Output	5V6GT	
V11	Sync Sep.	3CS6	Note 1
V12	Vert. Mult.	7AU7	Note 2
V13	Vert. Output	5AQ5	Note 3
V14	Horiz. Mult.	7AU7	Note 2
V15	Horiz. Output	25DN6	
V16	Horiz. Output	25DN6	

ITEM No.	USE	TYPE	NOTES
V17	Damper	19AU4GTA	
V18	Damper	19AU4GTA	
V19	Focus Rectifier	1X2B	
V20	HV Rectifier	3B2	
V21	HV Regulator	6BK4	
V22	1st Chroma Amp. -Sound IF Amp. -Color Killer	6AW8A	
V23	2nd Chroma Amp.	12BY7A	
V24	Burst Amp. -Chroma AGC	6AW8A	
V25	Chroma Reference Osc. - Color Killer Control	5AM8	
V26	Chroma Sync-Phase Det.	3AL5	
V27	Chroma Reference Osc. Control	3AU6	
V28	R-Y Demodulator-G-Y Demodulator	12BH7A	

Note 1: Some versions may use 3BY6 in this application.
Note 2: Some versions may use 6AU7 in this application.
Note 3: Some versions may use 5V6GT in this application.

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3924 MEADE ST.
DENVER, COLORADO

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	Westinghouse PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V29	22EP22				

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	500	200	218V003M01	AFHS2-30-75		FP217.74 TC69			R2400 *
C2	320	350	218V005M01	AFHS1-43-80		FP227.7 TC69			R2398 *
C3A	▲200	350	218V004M01	AFH4-56-88		FP342.2 TC69			R2399 *
B	20	25							
C	▲4	50							
D	■10	350							
C4A	▲100	350	218V006M01	AFH4-57-55					R2401 *
B	50	25							
C	■4	350							
D	▲50	50							

* Non-catalog items.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	12				TCZ-12	C10Q12C	TCO-12			
C6	47			NP0-SI 47	TCZ-47	C10Q47C	TCO-47		5TCC-Q47	
C7	4.7			NP0-SI 4.7	TCZ-4R7	C10V47C	TCO-4.7	ZT-5547	5TCCB-V47	
C8	1.5			NP0-SI 1.5	TCZ-1R5	C10V15C	TCO-1.5	ZT-5515	5TCCB-V15	
C9	3.0			NP0-SI 3.0		C10V3C	TCO-3	ZT-553		
C10	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C11	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C12	.5-3				829-3		3115-D	CT565A		
C13	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C14	1000			EF-001	MFT-1000				503C-D1	
C15	59									
C16	59									
C17	1.8			NP0-SI 1.5	TCZ-1R5	C10V15C	TCO-1.5	ZT-5515	5TCCB-V15	
C18	1.2			NP0-SI 1.0	TCZ-1		TCO-1		5TCCB-V1	
C19	.5-3				829-3		3115-D	CT565A		
C20	1000			EF-001	MFT-1000				503C-D1	
C21	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C22	6.8			NP0-SI 6.8	TCZ-6R8	C10V68C	TCO-6.8	ZT-5568	5TCCB-V68	
C23	10			BPD-00001	DD-100	L10Q1	ED-10	UC-541	5GA-Q1	
C24	1.5									N1500
C25	.39									
C26	15			NP0-SI 15	TCZ-15	C10Q15C	TCO-15		5TCC-Q15	
C27	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C28	1000			EF-001	MFT-1000				503C-D1	
C29	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C30	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C31	800			BPD-0008	DD-801	L10T8	ED-800		5GA-T8	
C32	1.5									
C33	4700		215V114A72	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5GA-D47	
C34	4700		215V114A72	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5GA-D47	
C35	1000		213V011A02	1467-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C36	680		215V116A81	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C37	680		215V116A81	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C38	2.2			NP0-SI 2.2	TCZ-2R2	C10V22C	TCO-2.2		5TCCB-V22	
C39	42									
C40	680		215V116A81	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C41	4700		215V114A72	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5HK-D47	
C42	680		215V116A81	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C43	680		215V116A81	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C44	680		215V116A81	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C45	680		215V116A81	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C46	680		215V116A81	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C47	1000		215V111A02	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C48	4.7		217V004A79	NP0-SI 4.7	TCZ-4R7	C10V47C	TCO-4.7	ZT-5547	5TCCB-V47	
C49	4700		215V114A72	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5HK-D47	
C50	330		213V013A31	1468-00033	DD-331	5W5T33	ED-330	UC-5333	4FM-333	
C51	.047	400	210V054A73	BPD-05	DF-503	CUB4S47		GEM-4147	4TM-S47	
C52	.1	400	210V051A04	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	REPLACEMENT DATA MALLORY PART No.	SPRAGUE PART No.	NOTES
C167	10000	2400	V10T10-13	P168BN 01		CL-BB50		GEM-1851	201KB-SI	
C168	10000	3500		P168BN 01		CL-BB50		GEM-1851	201KB-SI	

Note 1. Not used in some versions.
Note 2. Some versions may use a 47MMF (Part #1351V0147O) in this application.
Note 3. Some versions may use a 10000MMF (Part #1351V1A00) in this application.

CONTROLS

ITEM No.	RATING RESIST ANCE	RATING WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	270V0003S03	F1-T		4QJ-103T	UE1998	Picture - Note 3
B	5000K	½		R3-61		Not Req.	Not Req.	Volume-T-Sp.@50K-Note 1 & 3
C	Switch			S1-T		Not Req.	Not Req.	
R2A	60K	½	V10615-2	B-31	A47-75K-S	Q31-125	U41	Horizontal
B	Shaft			Not Req.	Not Req.	Not Req.	Not Req.	
R3A	1.5Meg	½	V15615-4	A4-T-1.5Meg-S	Q31-129	U155		Vertical
B	Shaft			A4-T3	Not Req.	Not Req.	Not Req.	
R4A	300Ω	½	270V0233M01	WW-303	A43-3000	WP2300	Not Req.	Brightness (Wire-wound)
B	Shaft			Not Req.	Not Req.	Not Req.	Not Req.	
R5A	500K	½						Vert. Lin.
B	Sldng		270V0165M01					Sync
C	Sldng							Height
R6A	500K	½	270V0123M01	AB-4	A47-750-S	Q31-105	PTA7SL	Quality
B	Shaft			A4E-19		TQ		
C	Switch		270V0123M01					Focus
R7A	250K	½	270V0153M01	B-7	A47-3500-S	Q31-113	UB	Color
B	Shaft			Not Req.	Not Req.	Not Req.	Not Req.	
R8A	3500Ω	½	270V0153M01	WW-300	A43-50	WP4350	R30L	Blue Horiz. Tilt (Wire-wound)
B	Shaft			Not Req.	Not Req.	Not Req.	Not Req.	
R9A	30Ω	3	270V0153M03	WW-300	A43-50	WP4350	R30L	
B	Shaft			Not Req.	FE3-1/4	Not Req.	Not Req.	Blue Vert. Amp.
R10A	100Ω	½	270V0153M04	AB-3				
B	Shaft			A4E-1				
R11	100Ω	1/4	270V0153M01	B-59	A47-500K-S	Q31-133	PTA2SL	Blue Vert. Tilt
R12A	3000	½		Not Req.	FE3-1/4	TM3-KIT	PTA2SL	Blue Background
B	Shaft			A47-305	A47-305	WP2300	R30L	Red-Green Horiz. Tilt (Wire-wound)
B	Shaft			Not Req.	FE3-1/4	Not Req.	Not Req.	Red Vert. Amp.
R14A	150Ω	½	270V0153M04	AB-3				
B	Shaft			A4E-1				
R15	100Ω	1/4	270V0153M03	B-78	A47-25Meg-S	Q31-139	PTA2SL	Green Vert. Tilt
R16A	25Meg	1/4	270V0153M01	WW-300	A43-50	WP4350	R30L	Blue Screen
B	Shaft							
R17A	30Ω	½	270V0153M03	WW-300	A43-50	WP4350	R30L	Red-Green Horiz. Tilt Bal. (Wire-wound)
B	Shaft			Not Req.	FE3-1/4	Not Req.	Not Req.	Red Vert. Amp.
R18A	150Ω	½	270V0153M04	AB-3				
B	Shaft			A4E-1				
R19	100Ω	½	270V0153M04	B-59	A47-500K-S	Q31-133	PTA2SL	Red Vert. Tilt
R20A	500K	1/4	270V0153M01	Not Req.	FE3-1/4	TM3-KIT	PTA2SL	Green Background
B	Shaft			Not Req.	FE3-1/4	TM3-KIT	Not Req.	
R21A	4Ω	½	270V0163M01	B-78	A47-25Meg-S	Q31-139	PTA2SL	Field Neutralizing (Wire-wound)
B	Shaft			Not Req.	FE3-1/4	TM3-KIT	Not Req.	
R22A	25Meg	1/4	270V0163M03	Not Req.	FE3-1/4	TM3-KIT	PTA2SL	Red Screen
R23A	25Meg	1/4	270V0163M01	B-78	A47-25Meg-S	Q31-139	PTA2SL	Green Screen
B	Shaft			Not Req.	FE3-1/4	TM3-KIT	Not Req.	

Note 1: Volume control part #270V0228G02, 500K used in Ch. V2293-11.
Note 2: Picture control part #270V0236M02, 250K used in Ch. V2293-11.
Note 3: Tap on volume control not used.
• Concentrisk Equivalent: Kit K-6, Base Elements and Shafts, B17-109 & P13-11B (Panel) B13-133 (Rear)
T-H-I Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	IRC PART No.	NOTES
R24	220K		HT3-220K	HT3-224	
R25	10K		HT3-10K	HT3-103	
R26	1Meg		HT3-1Meg		
R27	100K		HT3-100K		
R28	5.5Meg		BT8-L 5Meg		
R29	2500		250V234A72	BT8-25K	
R30	15K		HT3-15K		
R31	4700Ω		250V224A72	BT8-4700	
R32	4700Ω		250V234A72	BT8-4700	
R33	1800Ω		HT3-1800	BT8-1K8	
R34	33K		HT3-33K		
R35	100K		250V234A06	BT8-100K	
R36	100K		HT3-100K		
R37	4300Ω		HT3-4300	BT8-4K3	
R38	330Ω	4	250V104M03	PWF-3300	
R39	18Meg		250V212A85		Note 3
R40	2.5Meg		250V232A25	BT8-2.2Meg	Note 1
R41	470K		250V234A04		Note 2
R42	1000Ω		250V212A02		
R43	100K		250V212A04	BT8-100K	
R44	470K		250V224A71		
R45	470K		250V224A71	BT8-470	
R46	68Ω		250V224A80	BT8-68	
R47	470Ω		250V224A72		
R48	470Ω		250V234A72		
R49	470Ω		250V224A71	BT8-470	
R50	68Ω		250V224A80	BT8-68	
R51	4700Ω		250V224A73	BT8-4700	
R52	470Ω		250V224A71	BT8-470	
R53	56Ω		250V225A60	BT8-56	
R54	33Ω		250V063M05	BT8-33K	
R55	6800Ω	1	250V235A83	BT8-6800	
R56	56K			BT8-56K	
R57	180Ω		250V221A81	BT8-180	
R58	3900Ω		250V223A93	BT8-3900	
R59	270Ω		250V222A79	BT8-27	
R60	3300Ω		250V233A93	BT8-3300	
R61	680K		250V234A74	BT8-680K	
R62	4700Ω		250V224A73	BT8-4700	
R63	3300Ω		250V223A32	BT8-3300	

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	IRC PART No.	NOTES
R64	33K		250V233A03	BT8-33K	
R65	4700Ω	4	251V104M05		
R66	3900Ω	4	251V104M07	PWF-3900	
R67	820Ω	1	250V233A23	BT8-820	Note 8
R68	4700Ω	7	251V104M04		
R69	560Ω		250V225A59	BT8-560	
R70	180Ω	1	250V231A81	BT8-180	
R71	15K	2	250V215A35	BT8-15K	
R72	4700Ω		250V224A72	BT8-4700	
R73	15K	2	250V215A35	BT8-15K	
R74	4700Ω		250V221A22	BT8-1200	
R75	470Ω		250V224A71	BT8-470	
R76	220K		250V224A26	BT8-220K	
R77	12K		250V231A23	BT8-12K	
R78	27K	2		BT8-27K	
R79	1000Ω		250V221A02	BT8-1000	
R80	330Ω	1	250V233A81	BT8-330	
R81	15K		250V221A23	BT8-12K	
R82	18000	5%	250V721A82	BT5-1800 5%	
R83	22K	1	250V233A23	BT8-22K	
R84	470K		250V224A74	BT8-470K	
R85	270K		250V224A74	BT8-270K	
R86	270K		250V222A74	BT8-270K	
R87	39K		250V233A39	BT8-33K	
R88	22K		250V222A23	BT8-22K	
R89	2700Ω		250V222A72	BT8-2700	
R90	5600Ω	2	250V235A62	BT8-5600	
R91	680K		250V233A64	BT8-680K	
R92	100K	1	250V233A04	BT8-100K	
R93	6800Ω	1	250V235A82	BT8-6800	
R94	1200Ω		250V223A23	BT8-1200	
R95	270K		250V224A74	BT8-270K	
R96	680K		250V226A64	BT8-680K	
R97	47K	2	250V503M06	BT8-47K	
R98	33K		250V223A33	BT8-33K	
R99	2.2MEG		250V235A25	BT8-2.2Meg	Note 3
R100	180K		250V221A84	BT8-180K	
R101	470K		250V234A74	BT8-470K	
R102	100K				
R103	100Ω				

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	IRC PART No.	NOTES
R104	1Meg		250V221A05	BT8-1Meg	
R105	1.2Meg		250V221A25	BT8-1.2Meg	
R106	12K		250V221A23		
R107	4700Ω		250V224A72	BT8-4700	
R108	47K	1	250V224A73	BT8-47K	
R109	27K	1	250V224A73	BT8-27K	
R110	39000		250V223A93	BT8-3900	
R111	33000		250V233A33	BT8-3300	
R112	180K		250V223A84	BT8-180K	
R113	56K		250V233A63	BT8-56K	
R114	47K 5%		250V234A73	BT8-47K 5%	
R115	47K 5%		250V214A73	BT8-47K 5%	
R116	180K		250V234A84	BT8-180K	
R117	15K	3	250V421A33	BT8-15K	
R118	100K		250V233A04	BT8-100K	
R119	22000		250V223A23	BT8-22000	Note 8
R120	33K	2	250V233A33	BT8-33K	Note 4
R121	3300Ω	7	250V104M04		
R122	47K	2	250V503M07	BT8-47K	Note 5
R123	4700		250V224A72	BT8-4700	Note 6
R124	47K	2	250V503M07	BT8-47K	Note 5
R125	4700		250V224A72	BT8-4700	Note 6
R126	100Ω		250V221A01	BT8-100	
R127	150K		250V231A84	BT8-150K	
R128	4.7Meg	2	250V053M01	BT8-4.7Meg	
R129	4.7Meg	2	250V053M01	BT8-4.7Meg	
R130	4.7Meg	3	250V053M01	BT8-4.7Meg	
R131	4.7Meg	2	250V053M01	BT8-4.7Meg	
R132	470K	3	250V503M07	BT8-470K	
R133	470K	3	250V503M07	BT8-470K	
R134	1.5Meg 5%		250V001M32	BT8-1.5Meg 5%	Note 10
R135	1.5Meg 5%		250V001M32	BT8-1.5Meg 5%	Note 10
R136	470K 5%			BT8-470K 5%	
R137	330Ω	1	250V233A31	BT8-330	
R138	82000		250V223A32	BT8-8200	
R139	33000		250V233A33	BT8-3300	
R140	1000		250V221A01	BT8-100	
R141	2200Ω		250V223A23		
R142	4700Ω	7	250V104M04		
R143	2200Ω	4	251V104M02	PWF-2200	Note 8
R144	33K		250V233A33	BT8-33K	Note 7
R145	18K	1	250V231A83	BT8-18K	
R146	470Ω	1	250V231A47	BT8-470	
R147	27K	1	250V232A73	BT8-27K	
R148	220Ω		250V223A22	BT8-220	
R149	4700Ω		250V234A73		
R150	100Ω		250V221A01	BT8-100	
R151	100K		250V231A04	BT8-100K	
R152	68K		250V226A63	BT8-68K	
R153	100Ω		250V221A01	BT8-100	
R154	270Ω		250V222A79	BT8-27	
R155	10K		250V221A23	BT8-10K	
R156	56K		250V233A63		
R157	1.2Meg		250V232A25	BT8-1.2Meg	Note 3
R158	18Meg		250V231A85		
R159	1Meg		250V221A05		
R160	1Meg		250V221A05		
R161	150Ω		250V221A51	BT8-1500	
R162	1500Ω		250V221A52		
R163	1Meg		250V221A05	BT8-1Meg	

Note 1: Some versions may use a 1.2Meg in this application.
Note 2: Some versions may use a 680K in this application.
Note 3: Some versions may use a 820K in this application.
Note 4: Some versions may use a 47K, 2 W in this application.
Note 5: Some versions may use a 22K, 2 W in this application.
Note 6: Some versions may use a 33K in this application.
Note 7: Some versions may use a 30K in this application.
Note 8: Not used in some versions.
Note 9: Some versions may use a 2.2Ω in this application.
Note 10: Must be a matched pair.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	REPLACEMENT DATA Stancor PART No	Thordarson PART No	Triad PART No
T1	125 VAC @ 2.5A 6.3 V @ 1 A	6.3 V @ 9 A			410V005M01					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	Westinghouse PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Horiz Output Trans	401V002M01							
T3	Pulse Trans.	498V003M01							
T4	Vert. Output Trans.	430V009M01							
T5A	Yoke(Horiz & Vert.)	490V003M01							
	(Vert. 104MH)								
T6	Horiz. Linearity Coil	498V001M01							
	(38MH - 1.9MH)								
T7	Width Choke (6MH)	498V003M01							
T8A	Vert. Convergence Assembly	498V012M03							
	Isolation Choke								
C1									
T9	Blue Horiz Amp Coil (5-4 MH)	498V005M04							
T10	Red & Green Horiz Amp Coil (1-9 2MH)	498V005M03							
T11	Red & Green Tilt Balance (15-9 5MH,	498V004M01							
T12	Convergence Yoke Assembly	498V007M01							
T13	Field Neutralizing Coil	498V006M01							

WLC-4

1. Includes capacitor C100, resistors R102 and R103.
2. Reading taken each side of center tap

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	REPLACEMENT DATA MALLORY PART No.	SPRAGUE PART No.	NOTES
C85	33	400	270V052A24	P488N-33		CUB4P33		GEM-4032	4TM-P32	
C94	1	200	270V043A04	P388N-1		CUB1P1		GEM-301	2TM-C9	
C96	0.022	400	270V083A33	B7D-03	DF-304	CUB4S22	ED-03	GEM-4123	4TM-S22	
C95	.047	400	270V094A73	B7D-06	DF-303	CUB4S47		GEM-4147	4TM-S47	
C97	.47	400	270V094A74	P488N-47		CUB4S47		GEM-4147	4TM-P47	
C98	5	6	270V003A69							
C99	5	6	1351V3A69	NPO-51 2.5	TCZ-5R2	C10Y32C	TCO-2.5		5TCCB V32	
C99	6700	470	270V064A72	B7D-0047		B7A10D47	ED-0047	UC 5247	5HK-D47	
C99	4700		270V064A72	B7D-0047		D7-472	5Y4D47	UC 5247	5HK-D47	
C99	3300		270V104A32	B7D-033		B7A10D33	ED-0033	DC5Z5	5HK-D33	
C93	082	400	270V052A23	B7D-03		CUB4S22	ED-02	GEM-4122	4TM-S22	
C94	0047	400	270V064A73	B7D-047		CUB4S47	GP-4700	GEM-4147	4TM-S47	
C95	370		270V062A71	1468-00037		D7-371	5WS737	ED-270	UC 5227	1TM-337
C96	01	400	270V052A03	B7D-03		CUB4S		GEM-4103	4TM-S10	
C97	047	400	270V064A73	B7D-047		CUB4S47		GEM-4147	4TM-S47	
C98	390		270V062A71	1468-00037		D7-391	5WS739	ED-390	UC 5239	1TM-339
C99	940		270V062A71	1467-00068		D7-681	1WS784	ED-680	UC 5368	1FM-368
C80	01	400	270V052A03	B7D-03		CUB4S	GP-10000	GEM-4103	4TM-S10	
C81	047	400	1351V4A74	B7D-047		B7A10D47	ED-0047	UC 5247	5HK-D47	
C83	33	400	270V052A33	B7D-03		CUB4S33	GP-10000	GEM-4133	4TM-S33	
C84	01	400	270V052A03	B7D-03		CUB4S10		GEM-4103	4TM-S10	
C85	....	200	270V104A32	P388N-032		CUB4S33		GEM-3233	3TM-S32	
C86	68		1351V1M02	1484-001		1W5D1	CT15C103K	MCB355	MS-3Z	
C87	68		1.5V0A80							
C88	0.150		270V083M01							
C87	390		270V052A39	1468-00039	DD-391	5WS739	ED-390	UC-5239	1FM-339	
C88	33	400	270V052A33	B7D-03		CUB4S	GP-10000	GEM-4103	4TM-S10	
C89	1	400	270V052A04	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C90	1	400	270V052A04	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C91	68		1351V4A74	B7D-047		B7A10D47	ED-0047	UC 5247	5HK-D47	
C92	68		1351V6M01	1468-00068	DD-681	5WS768	ED-680	UC-5368	5GA-T68	
C93	390		270V062A71	1468-00037	DD-391	5WS739	ED-390	UC-5239	1FM-339	
C94	940		270V062A71	1467-00068	DD-681	1WS784	ED-680	UC 5368	1FM-368	
C80	01	400	270V052A03	B7D-03		CUB4S	GP-10000	GEM-4103	4TM-S10	
C81	.047	400	270V064A73	B7D-047		CUB4S47		GEM-4147	4TM-S47	
C82	033	600	270V062A32	P488N-032	DF-303	CUB4S33	ED-03	GEM-4123	4TM-S22	
C95	100	2000	1351V0M04	D080-101		1W5D1			5TCCB T1	
C96	500	1250	V18J3--			TV5-502				
C97	033	600	270V052A33	P488N-032	DF-303	CUB4S33	ED-03	GEM-4123	4TM-S22	
C98	82	400	1351V1M01							
C99	82	400	1351V1M01							
C100	240	5000								
C101	22		215V300M22	NPO-81 22	TCZ-22	C10G23C	TCO-22		5TCC-G22	
C102	10000		215V103A03	B7D-08		B7A10D		DC5Z5	5HK-S1	
C103	10000		215V1A03	B7D-01		B7A10D	ED-01	DC5Z1	5HK-S1	
C104	100		215V0J1A	1468-00001	DD-101	5WS101	ED-100	UC-5103	5HK-S1	
C105	2000		215V1A03	B7D-01		B7A10D	ED-01	DC5Z1	5HK-S1	
C106	200		215V04LA22	1467-00021	DE-121	1WS1X1	ED-1200	UC-5121	1FM-121	
C107	10000		215V103A03	B7D-01	DD-103	B7A10D	ED-01	DC5Z1	5HK-S1	
C108	10000		215V1A03	B7D-01		B7A10D	ED-01	DC5Z1	5HK-S1	
C109	10000		215V1A03	B7D-01	DD-103	B7A10D	ED-01	DC5Z1	5HK-S1	
C110	4700		215V14A72	B7D-0047		B7A10D47	ED-0047	UC-5247	5HK-D47	
C111	4700		215V14A72	B7D-0047		B7A10D47	ED-0047	UC-5247	5HK-D47	
C112	047	400	270V064A73	B7D-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C113	4700		215V14A72	B7D-0047		B7A10D47	ED-0047	UC-5247	5HK-D47	
C114	4700		215V14A72							N150
C115	3	3	215V300M3E	NPO-81 3.3	TCZ-3R3	C10Y32C	TCO-3.3	ZT-5553	5TCCB V33	
C116	0047		215V14A74	B7D-0047		B7A10D47	ED-0047	UC-5247	5HK-D47	
C117	1000		215V103A02	B7D-01	DD-102	B7A10D	ED-1000	DC5Z1	5HK-D1	
C118	68		215V10SA80	1468-00068	DD-680	5WS268	ED-68	UC-5468	1FM-468	Note 2
C119	1000		215V103A02	B7D-01	DD-102	B7A10D	ED-1000	DC5Z1	5HK-D1	
C120	68		215V10SA80	1468-00068	DD-680	5WS268	ED-68	UC-5468	1FM-468	
C121	1000			B7D-01	DD-102	B7A10D	ED-1000	DC5Z1	5HK-D1	
C122	3	3	215V300M3E							
C123	3-7		215V303M3E							
C124	33	200	210V043A34	P388N-33				GEM-3033		
C125	4700		215V14A72	B7D-0047	DD-472	B7A10D47	ED-0047	UC-5247	5HK-D47	
C126	5865		215V304M5E	1484-00056		5WS256	CY15C565K		MS-356	
C127	33		215V300M33	1468-00033	DE-330	5WS233	ED-33	UC-5233	1FM-433	
C128	47		215V04LA47	1468-00047	DE-470	5WS247	ED-47	UC-5247	1FM-447	
C129	1	400	270V052A04	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	Note 3
C130	470		215V14A71	B7D-0047	DD-471	B7A10D47	ED-470	UC-5347	5HK-D47	
C131	1	400	210V09M04	P488N-1	DF-104	HC8P1J		ACE501	8SE-P1	Note 3
C132	4.7		217V004A79	NPO-81 4.7	TCZ-4R7	C10Y47C	TCO-4.7	ZT-5547	5TCCB-V47	
C133	4.7		217V004A79	NPO-81 4.7	TCZ-4R7	C10Y47C	TCO-4.7	ZT-5547	5TCCB-V47	
C134	10000		215V1A03	B7D-01		B7A10D	ED-01	DC5Z1	5HK-S1	
C135	10000		215V1A03	B7D-01		B7A10D	ED-01	DC5Z1	5HK-S1	
C136	10000		215V1A03	B7D-01	DD-103	B7A10D	ED-01	DC5Z1	5HK-S1	
C137	4700		215V14A72	B7D-0047		B7A10D47	ED-0047	UC-5247	5HK-D47	
C138	2	2	215V300M2P	NPO-81 2.2	TCZ-2R2	C10Y22C	TCO-2.2		5TCCB-V22	
C139	4700		215V14A72	B7D-0047	DD-472	B7A10D47	ED-0047	UC-5247	5HK-D47	
C140	4700		215V14A72	B7D-0047		B7A10D47	ED-0047	UC-5247	5HK-D47	
C141	10000		215V1A03	B7D-01	DD-103	B7A10D	ED-01	DC5Z1	5HK-S1	
C142	470		215V14A70	1468-00047	DD-470	B7A10D47	ED-470	UC-5347	5HK-D47	
C143	4.7		217V300M2P	NPO-81 4.7	TCZ-4R7	C10Y47C	TCO-4.7	ZT-5547	5TCCB-V47	
C144	4.7		217V004A79	NPO-81 4.7	TCZ-4R7	C10Y47C	TCO-4.7	ZT-5547	5TCCB-V47	
C145	75		213V007A50	1469-00075	TCZ-75	22R5Q75	CY10C750J		MS 475	
C146	4700		215V14A72	B7D-0047	DD-473	B7A10D47	ED-0047	UC-5247	5HK-D47	
C147	4700		215V14A72	B7D-0047	DD-473	B7A10D47	ED-0047	UC-5247	5HK-D47	
C148	4700		215V14A72	B7D-0047	DD-473	B7A10D47	ED-0047	UC-5247	5HK-D47	
C149	33		215V300M33	1468-00033	DE-330	5WS233	ED-33	UC-5233	MS-433	
C150	1	400	270V052A04	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	Note 3
C151	27		215V02A10	D8-270		L27G27	ED-27	UC-5427	1GA-G27	
C152	10000	2400	V10T10-13	P168BN-01		CUB6S		GEM-1851	201KB-SI	
C153	10000	3400	V10T10-3	P168EN-01		CUB8S		GEM-1851	201KB-SI	
C154	10000	3500	V10T10-3	P168EN-01		CUB8S		GEM-1851	201KB-SI	
C155	022	400	270V052A23	P488N-022	DF-303	CUB4S22	ED-02	GEM-4122	4TM-S22	
C156	47	200	270V104A74	P388N-47		CUB2P47		GEM-3047	3TM-P47	
C157	47	200	270V044A74	P288N-47		CUB2P47		GEM-3047	2TM-P47	
C158	47	200	270V044A74	P288N-47		CUB2P47		GEM-3047	2TM-P47	
C159	680		215V15A68	B7D-00068	DD-681	B7A10D68	ED-680	UC-5368	5GA-T68	
C160	680		215V15A81	B7D-00068	DD-681	B7A10D68	ED-810	UC-5368	5GA-T68	
C161	680		215V15A81	B7D-00068	DD-681	B7A10D68	ED-680	UC-5368	5GA-T68	
C162	680		215V15A81	B7D-00068	DD-681	B7A10D68	ED-680	UC-5368	5GA-T68	
C163	4700		215V14A72	B7D-0047	DD-472	B7A10D47	ED-0047	UC-5247	5HK-D47	
C164	10000		215V1A03	B7D-01	DD-103	B7A10D	ED-01	DC5Z1	5HK-S1	
C165	4700		215V14A72	B7D-0047	DD-472	B7A10D47	ED-0047	UC-5247	5HK-D47	Note 1
C166	4700		215V14A72	B7D-0047	DD-472	B7A10D47	ED-0047	UC-5247	5HK-D47	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T14	5000Ω	3-4Ω	430V027M01	Z1001 ①	A-2930	A-3877	24S51	S-3X	① Tape center tap on primary winding.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω	570V005M01	6A1	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	1st Video IF	V16167-1				Includes 41.25MC Trap, 10MMF, 56MMF and 47K resistor.
L2	2nd Video IF	V15068-2	17-4523	TV-130	6219	
L3	47.25MC Trap	230V023M02	20-1049	TV-153		
L4	3rd Video IF	V15068-2		TV-130	6219	
L5	4th Video IF	V15068-2	17-4524	TV-130	6219	
L6	RF Choke	230V019M05	19-1006		4624	14 Microhenries
L7	Series Peaking Coil	230V019M01	19-3075	TV-186	6172	73 Microhenries
L8	Shunt Peaking Coil	230V019M09	19-3500	TV-188	6174	500 Microhenries
L9	RF Choke	230V019M05	19-1006		4624	14 Microhenries
L10	1st Video Amp. Plate Trans.	235V018M01				
L11	Series Peaking Coil	230V019M01	19-3075	TV-186	6172	73 Microhenries
L12	3.58MC Trap	230V009M02				5.8 Microhenries; Variable.
L13	Series Peaking Coil	V15796-1	19-3100	TV-181	6112	100 Microhenries
L14	Series Peaking Coil	230V010M03	19-3250	TV-185	6181	250 Microhenries
L15	Shunt Peaking Coil	230V010M03	19-3250	TV-185	6181	250 Microhenries
L16	RF Choke	230V019M04				4.7 Microhenries
L17	Shunt Peaking Coil	V15480-3	19-3125		6120	140 Microhenries
L18	4.1MC Trap	230V012M06				47 Microhenries; Variable.
L19	RF Choke	230V019M05	19-1006		4624	14 Microhenries
L20	Sound IF	230V012M04	17-3412	TV-151	1469	
L21	Fil. Choke	230V019M06	19-1000		4602	1.1 Microhenries
L22	Quadrature Coil	230V013M02			1481	
L23	RF Choke	230V019M05	19-1006		4624	14 Microhenries
L24	Chroma Trans.	235V012M01				Includes 4.5MC Trap
L25	Fil. Choke	230V019M06	19-1000		4602	1.1 Microhenries
L26	Burst Amp. Trans.	235V010M01				
L27	RF Choke	230V019M05	19-1006		4624	14 Microhenries
L28	Series Peaking Coil	V15480-3	19-3125		6120	140 Microhenries
L29	Chroma Ref. Osc. Plate Coil	230V012M07	17-6011			120 Microhenries; Variable.
L30	Cath. Choke	230V019M05	19-1006		4624	14 Microhenries
L31	Chroma Ref. Osc. Plate Trans.	235V009M02				
L32	Shunt Peaking Coil	230V019M09	19-3500	TV-188	6174	500 Microhenries
L33	RF Choke	230V019M07				25 Microhenries
L34	G-Y Phase Coil	230V012M01				4 Microhenries; Variable.
L35	Demodulator Driver Trans.	235V013M01				
L36	RF Choke	230V019M05	19-1006		4624	14 Microhenries
L37	Shunt Peaking Coil	230V019M09	19-3500	TV-188	6174	500 Microhenries
L38	Shunt Peaking Coil	230V019M03	19-5101			1.8 Millihenries
L39	RF Choke	230V019M05	19-1006		4624	14 Microhenries
L40	Series Peaking Coil	230V019M09	19-3500	TV-188	6174	500 Microhenries
L41	Series Peaking Coil	230V019M03	19-5101			1.8 Millihenries
L42	Series Peaking Coil	230V019M03	19-5101			1.8 Millihenries
L43	RF Choke	230V028M02				3.3 Microhenries; IRC part #CLA
L44	RF Choke	230V028M02				3.3 Microhenries; IRC part #CLA
L45	RF Choke	230V028M02				3.3 Microhenries; IRC part #CLA
L46	RF Choke	230V028M02				3.3 Microhenries; IRC part #CLA
L47	RF Choke	230V028M02				3.3 Microhenries; IRC part #CLA
L48	RF Choke	230V028M02				3.3 Microhenries; IRC part #CLA

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L49	110Ω		V15791-1							

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L50	.600A	18Ω	.7 HY	430V006M01					

CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L51	0 A	16Ω	.5HY	430V023M01				20C58 ①	

① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA	
K1	Vertical Intergrator	10000MMF, 2000MMF, 5000MMF, 5000MMF, 22K, 8200Ω, 8200Ω, 22K	V-11192-1	Aerovox Centralab Erie Sprague	PA-111 PC-101 1405-02 V-2

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA						
	CURRENT (Measured)	Westinghouse PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.
M1	.600A	295V003M01①	1223 ①		RS1000S ①	6S750 ①		757S ①
M2	.600A	295V003M01 ①	1223 ①		RS1000S ①	6S750 ①		757S ①

① Selenium type.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Westinghouse PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	C	7A 125V	758V001M06	V16214-18	332007 (C 7A)	346013	C 7	HC5 to 7
M4	C	3/4A 250V	758V001M04	V16214-12	332.750 (C 3/4)	346003	C 3/4	HC$\frac{1}{2}$ to 3/4

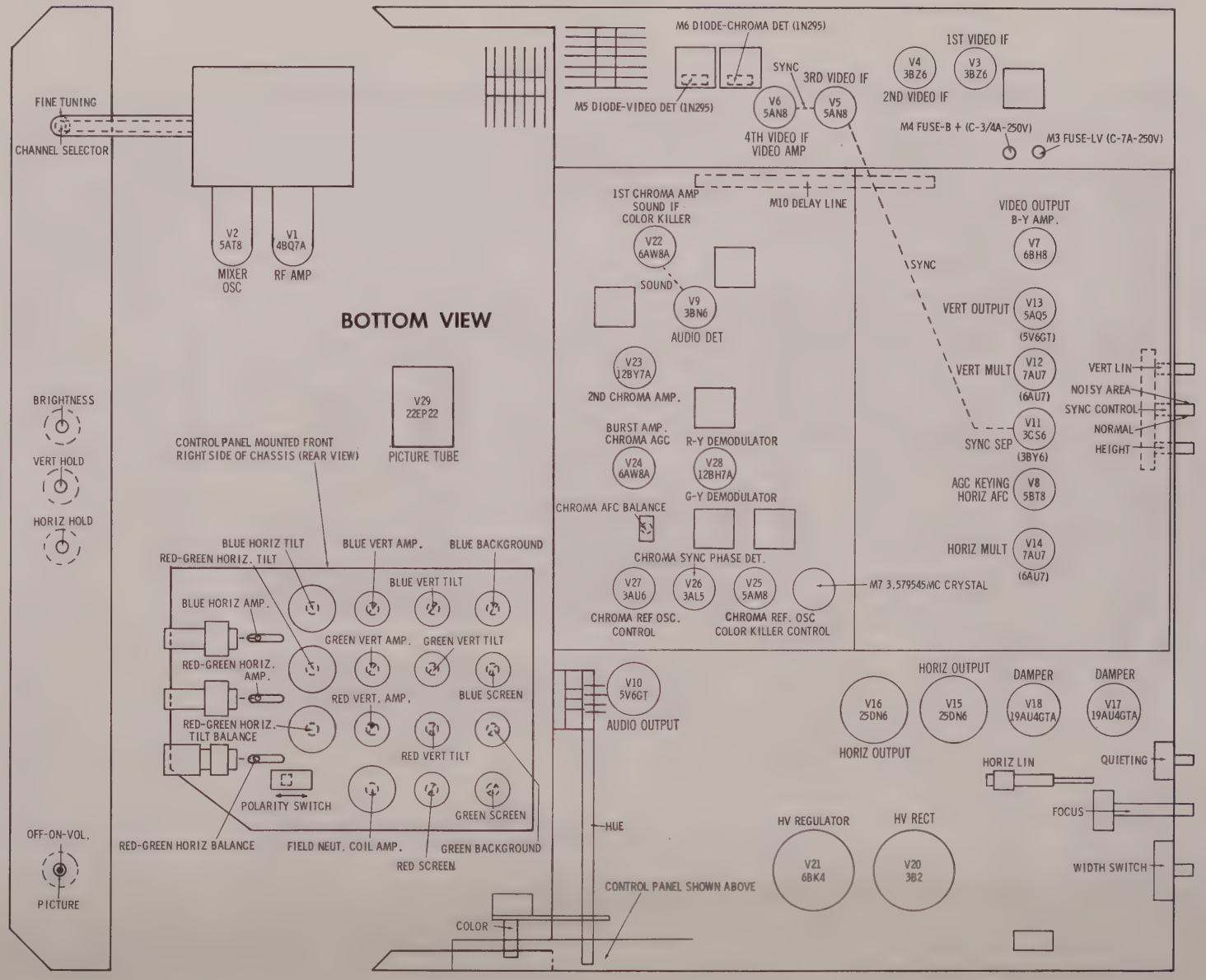
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		Westinghouse PART No.	SYLVANIA PART No.	
M5	1N295*		1N60	Video Detector (Pigtail)
M6	1N295*		1N60	Chroma Detector-Sound IF Detector (Pigtail)

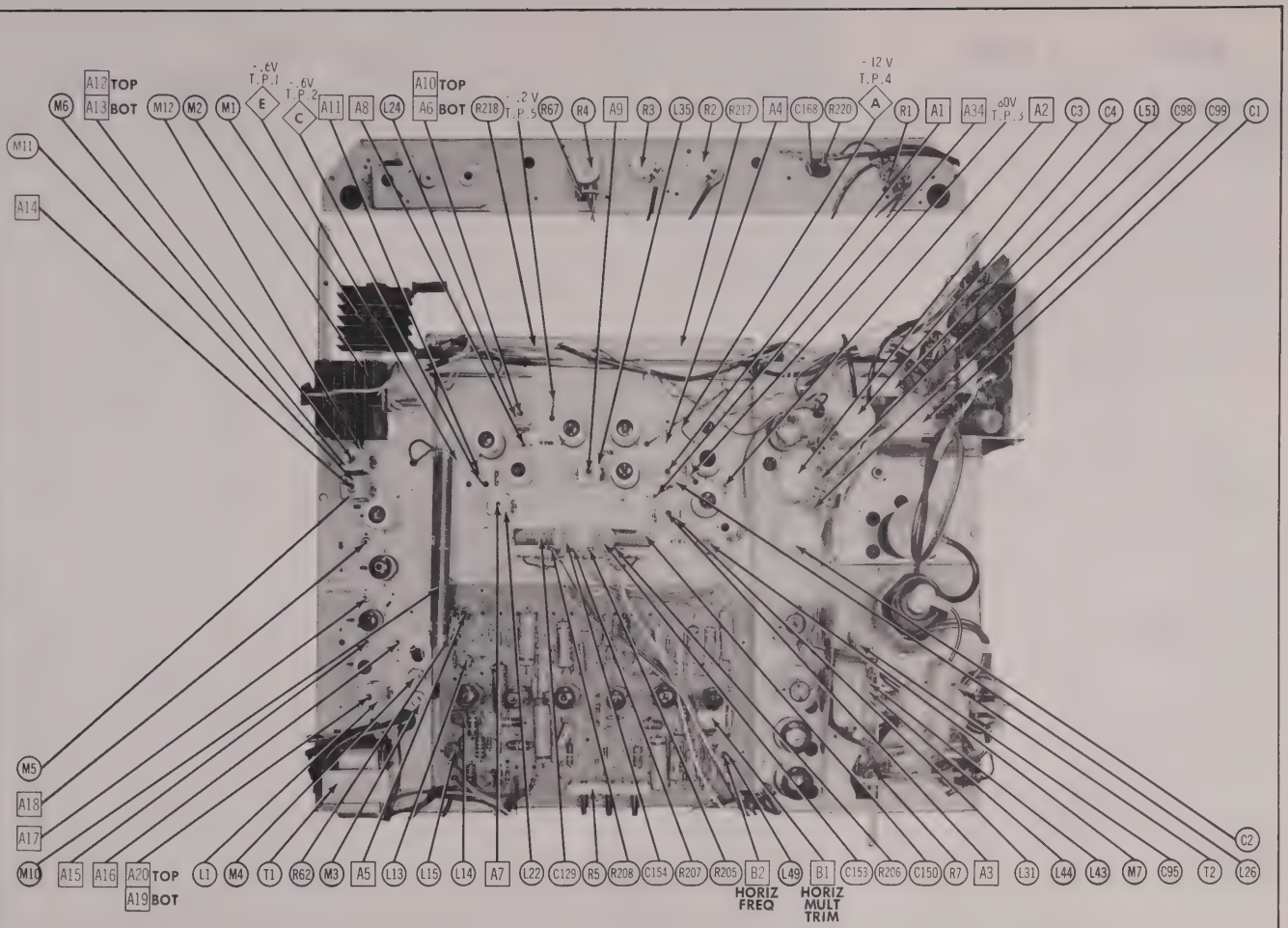
* 1N60 may be used in some versions.

MISCELLANEOUS

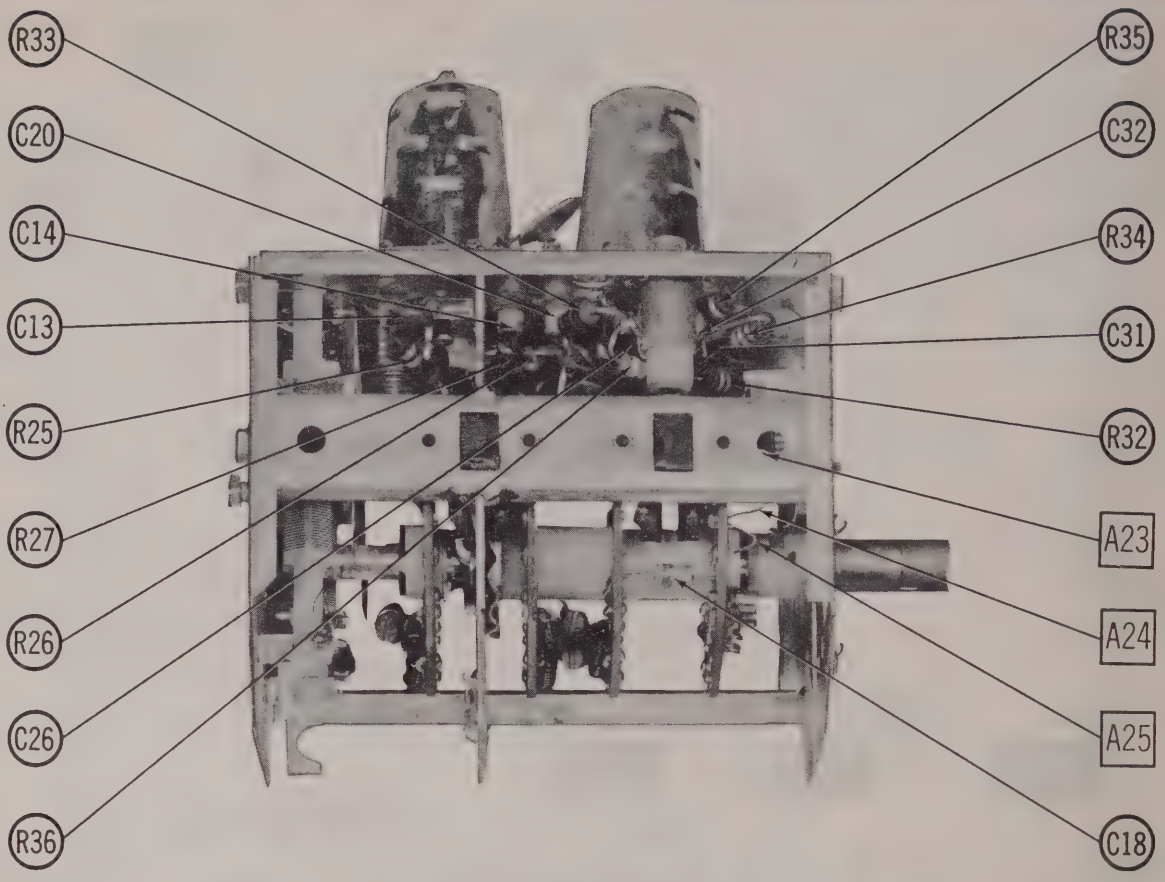
ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M7	Crystal	296V001M01	3.579545MC Oscillator
M8	Tuner	470V006M01	VHF, 12 position
M9	Trimmer Cap.	330V004M01	Hue Control, 5-25MMF
M10	Delay Line	230V017M02	Luminance Channel
M11	Crystal Det. Assy.	235V002M01	Chroma Det, Includes coils, caps., and M6
M12	Crystal Det. Assy.	V16166-1	Luminance Det., Includes coils, caps., and M5
M13	Switch	756V003M01	Width, Rotary wafer type, 3 position
M14	Switch	V5406-1	Polarity, (Slide type, DPDT)
M15	Magnet	V15300-1	Purity
M16	Magnet	V16055-1	Blue lateral beam positioning
M17	Magnet	496V001M02	Edge purity
	Yoke Housing	781V029M01	
	Printed Board	350V014M01	
	Safety Glass	630V007M01	
	Mask	610V003M02	
	Knob	550V027M02	VHF Channel selector, 12 position, Model H-22T157A
	Knob	550V026M01	VHF channel selector, Model H-22T157A
	Knob	550V003M01	VHF Channel selector, Models H-22T155, 156
	Knob	V-15670-3	Brightness, Vert. Hold, Horiz. Hold
	Knob	550V023M01	Tone, Model H-22T157A
	Knob	V-15812-4	Picture
	Knob	550V025M01	Picture, Model H-22T157A
	Knob	V-15810-3	On-off volume
	Knob	550V024M01	On-off volume, Model H-22T157A
	Knob	550V002M02	Hue, Color control, Model H-22T155
	Knob	550V002M01	Hue, Color control, Model H-22T156
	Control Cover	558V030M03	Model H-22T155
	Control Cover	558V030M04	Model H-22T156
	Control Cover	559V012M01	Model H-22T157A
	Cabinet	516V026M01	Models H-22T155, 157A
	Cabinet	516V026M02	Model H-22T156



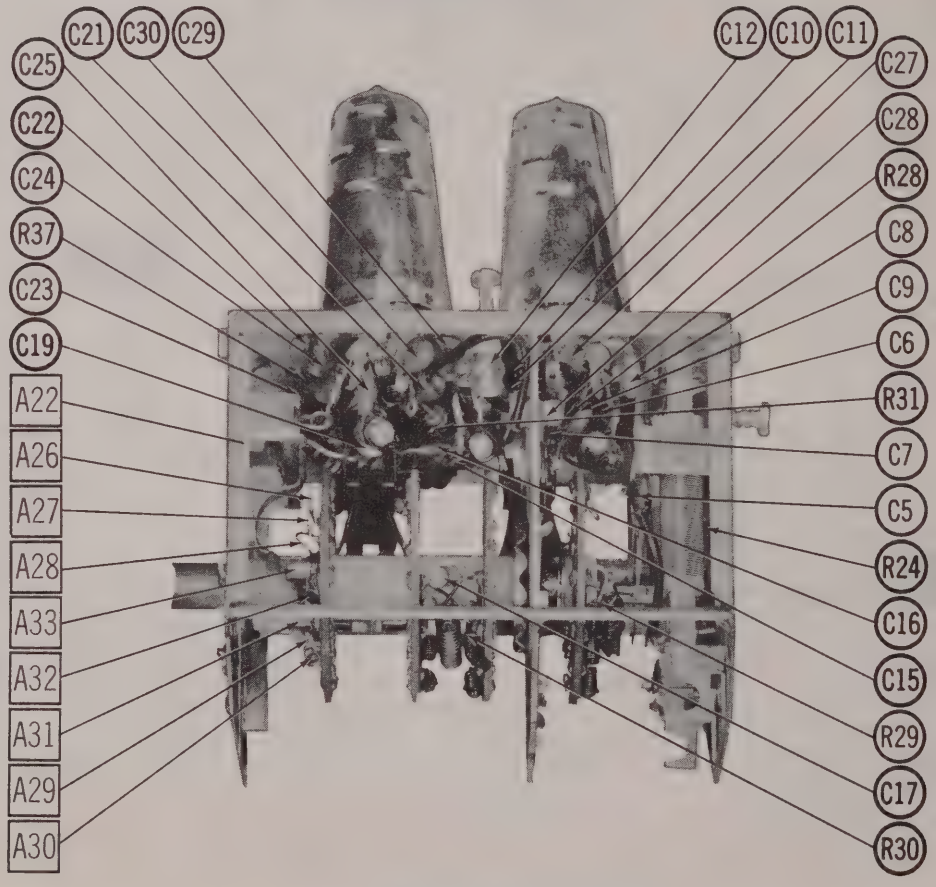
TUBE PLACEMENT CHART



CHASSIS-TOP VIEW



RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE

WESTINGHOUSE MODEL H-602P7 (Ch. V-2295-1)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

WESTINGHOUSE MODEL H-602P7 (Ch. V-2295-1)

WESTINGHOUSE MODEL H-602P7 (Ch. V-2295-1)

TRADE NAME	Westinghouse Model H-602P7 (Ch. V-2295-1)
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N.J.
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	9 Volts DC
RATING	9MA @ 9 Volts DC
TUNING RANGE—BROADCAST	540KC - 1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in the same relative position to chassis as when the receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1625KC	"	"	A4	"
3.		"	1400KC	Tune to 1400KC signal.	"	A5	"

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

WESTINGHOUSE
MODEL H-602P7 (Ch. V-2295-1)

TRANSISTORS

ITEM No.	USE		Westinghouse PART NO.	NOTES
X1	Converter	(2N172)	297V006M01	
X2	1st IF Amp.	(2N145)	297V002M01	Note 1
X3	2nd IF Amp.	(2N147)	297V002M03	Note 1
X4	AF Amp.	(2N217)	297V007M02	
X5	Driver	(2N217)	297V007M02	
X6	Output	(2N217)	297V007M02	Note 2
X7	Output	(2N217)	297V007M02	Note 2

Note 1: X2 and X3 may be type 2N146.
Note 2: X6 and X5 must be a matched pair.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	12	218V012M04	SRE12V100	NL100-10				R2386*
C2	100	12	218V012M04	SRE12V100	NL100-10				R2386*
C3	25	6	218V012M05	XPP10V25	NL25-6	TT6X25	ML30-6		TE-1092
C4	10	12	218V012M06	XPP12V10	NL10-15	TT12X10	ML10-15		TE-1128
C5	40	12	218V012M07	XPP10V40	NL50-10		ML40-15		R2329*
C6	10	12	218V012M06	XPP12V10	NL10-15	TT12X10	ML10-15		TE-1128
C7	100	12	218V012M04	SRE12V100	NL100-10				R2386*

* Non catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C8	.05	200	210V111M02	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C9	10000		215V300M12	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C10	.05	200	210V111M02	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C11	.1	200	210V111M03	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C12	.05	200	210V111M02	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C13	.1	200	210V111M03	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C14	.05	200	210V111M02	BPD-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C15	50000		215V303M03	BPD-05	DF-503	CUB6S5		GEM-615	5HK-S5	
C16	50000		215V303M03	BPD-05	DF-503	CUB6S5		GEM-615	5HK-S5	
C17	2200		215V112A22	BPD-0022	DD-222	BYA10D22	ED-0022	UC-5222	5GA-D22	
C18	.1	200	210V111M03	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	

CONTROLS

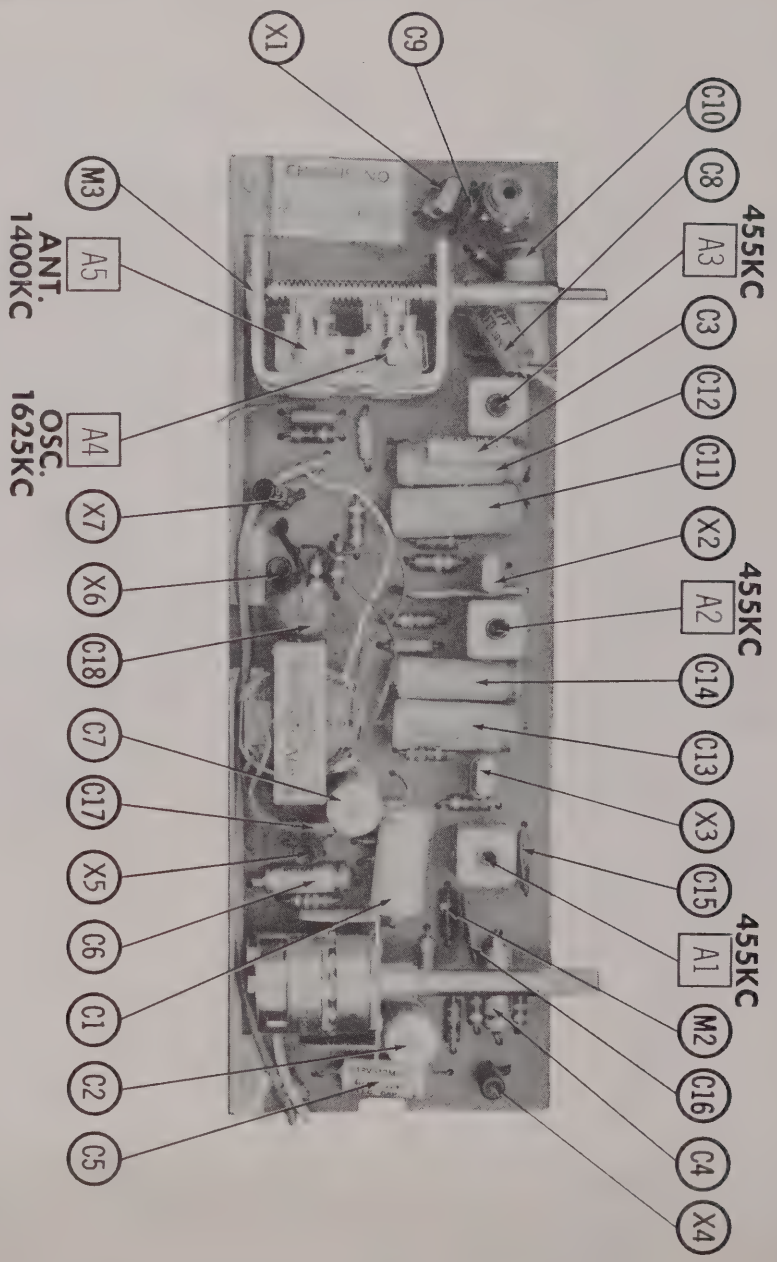
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1500Ω	½	270V028M01					Volume
B	2500Ω	½						Volume
C	Switch							

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Westinghouse PART No.	IRC PART No.	
R2	150K		250V221A54	BTS-150K	
R3	1500Ω		250V221A52	BTS-1500	
R4	560Ω		250V225A61	BTS-560	
R5	39K		250V223A93	BTS-39K	
R6	560Ω		250V225A61	BTS-560	
R7	15K		250V221A53	BTS-15K	
R8	2200Ω		250V222A22	BTS-2200	
R9	22K		250V222A23	BTS-22K	
R10	220Ω		250V222A21	BTS-220	
R11	470Ω		250V234A71	BTS-470	
R12	4700Ω		250V224A72	BTS-4700	
R13	56K		250V225A63	BTS-56K	
R14	4700Ω		250V224A72	BTS-4700	
R15	1000Ω		250V221A02	BTS-1000	
R16	470Ω		250V224A71	BTS-470	
R17	18K		250V221A83	BTS-18K	
R18	3900Ω		250V223A92	BTS-3900	
R19	1000Ω		250V221A02	BTS-1000	
R20	220Ω		250V232A21	BTS-220	
R21	39Ω		250V223A90	BTS-39	
R22	2400Ω 5%		250V212A42	BTS-2400 5%	
R23	10Ω		250V221A00	BTS-10	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	Turns Ratio		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2 : 1		430V028M01						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	110Ω CT	3-4Ω	Part of spkr.				TR-21 ①		① Drill new mtg. hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	4" X 6"	PM	3-4Ω	570V012M01①	46A07	① Includes T2.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Stick	310V014M01	14-9009			
L2	Osc. Coil	230V024M01	14-9012			
L3	1st IF Trans.	235V017M01	16-9007			
L4	2nd IF Trans.	235V017M01	16-9007			
L5	3rd IF Trans.	235V017M02	16-9004			

BATTERIES

ITEM No.	VOLTAGE	Westinghouse PART No.	REPLACEMENT DATA								
			BURGESS			EVEREADY			MALLORY		
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	"A"	"B"	"A-B"
M1	9V			*D-6			*276			*M-1603	

* Two required in parallel.

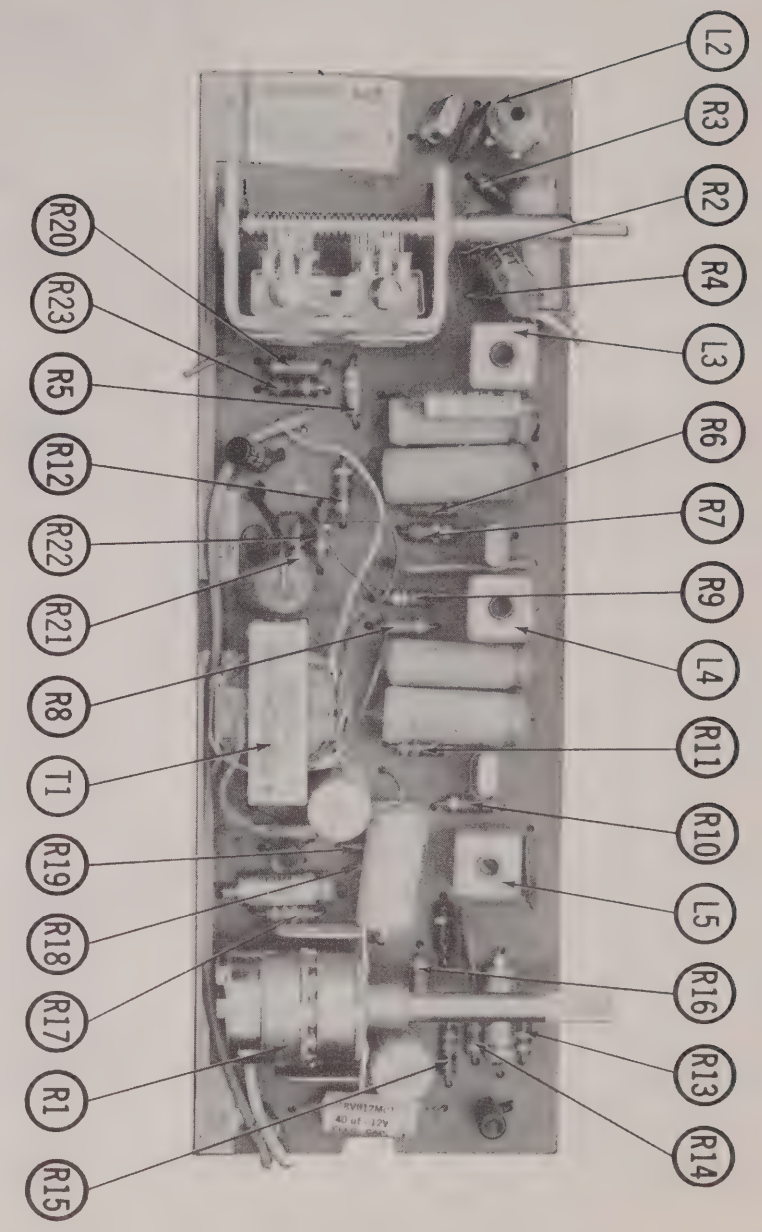
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		Westinghouse PART No.	SYLVANIA PART No.	
M2	1N87G	296V002M01	1N60	Audio Detector (Pigtail)

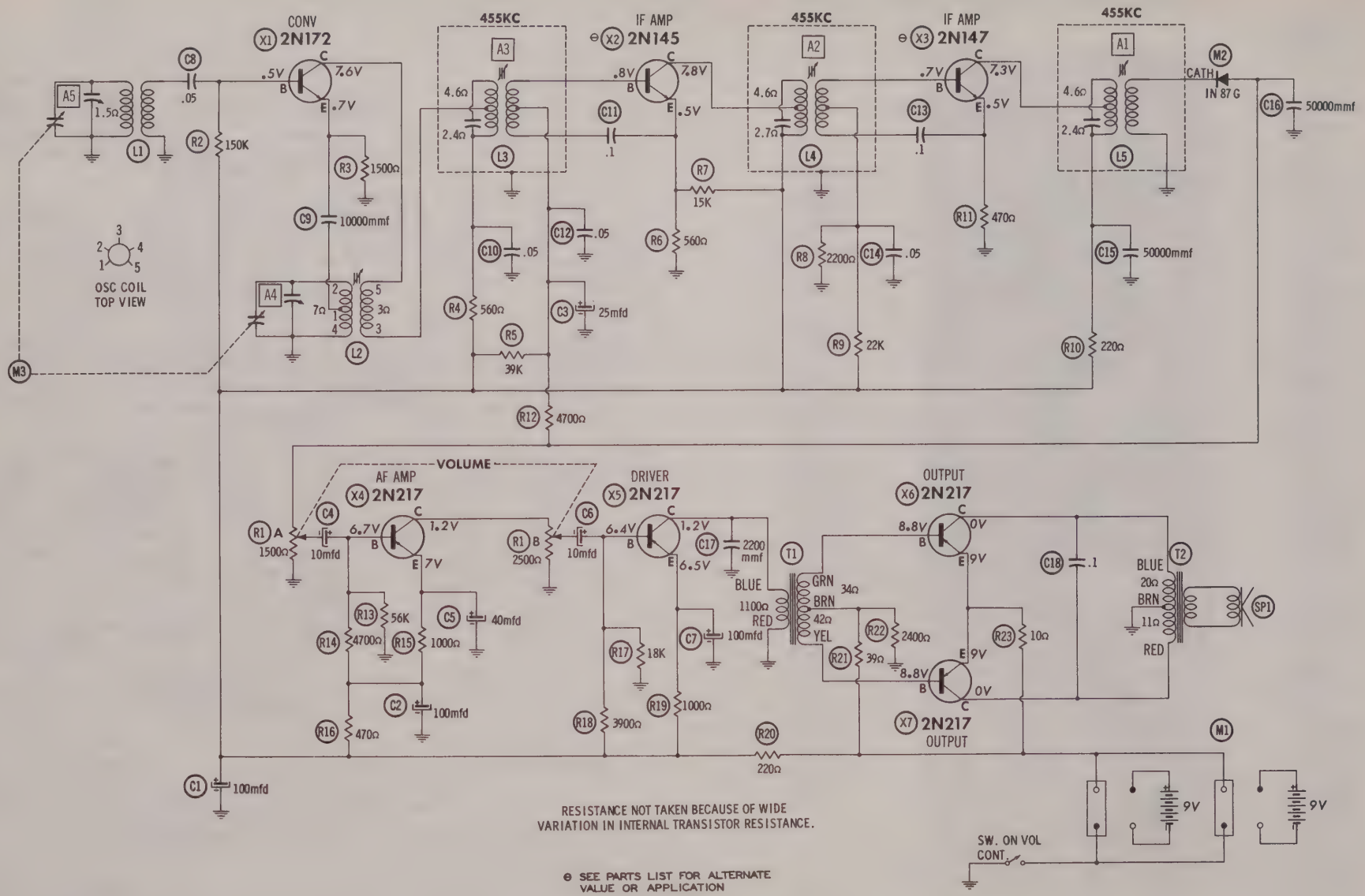
MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M3	Tuning Cap.	330V008M01	Two Gang (18-85MMF Ant. Section)
	Handle	V19022-1	
	Printed Board	V-2295	
	Knob	550V013M13	On-Off Volume
	Knob	550V030M01	Tuning
	Knob	550V019M01	Dial
	Cabinet	513V010M01	

CHASSIS—TOP VIEW



WESTINGHOUSE
MODEL H-602P7 (Ch. V-2295-1)



RESISTANCE NOT TAKEN BECAUSE OF WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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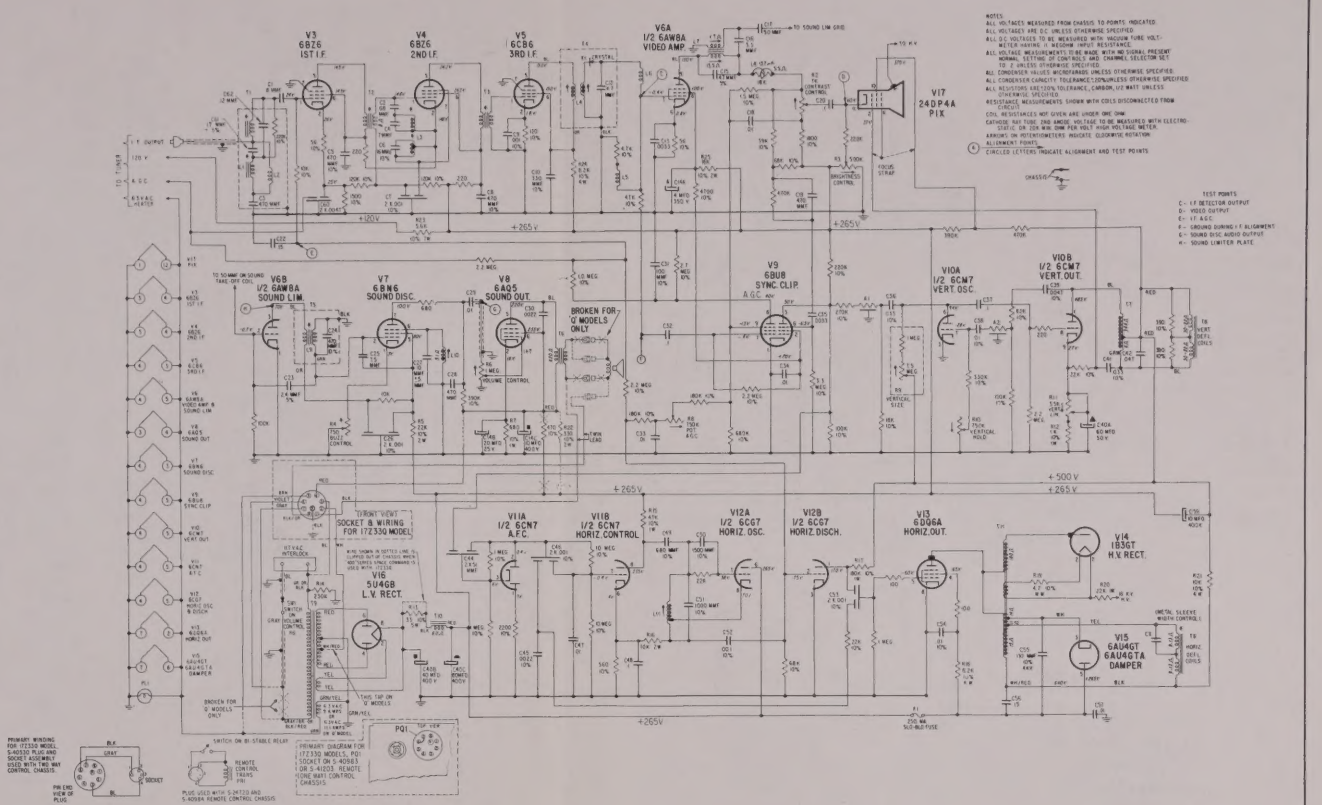
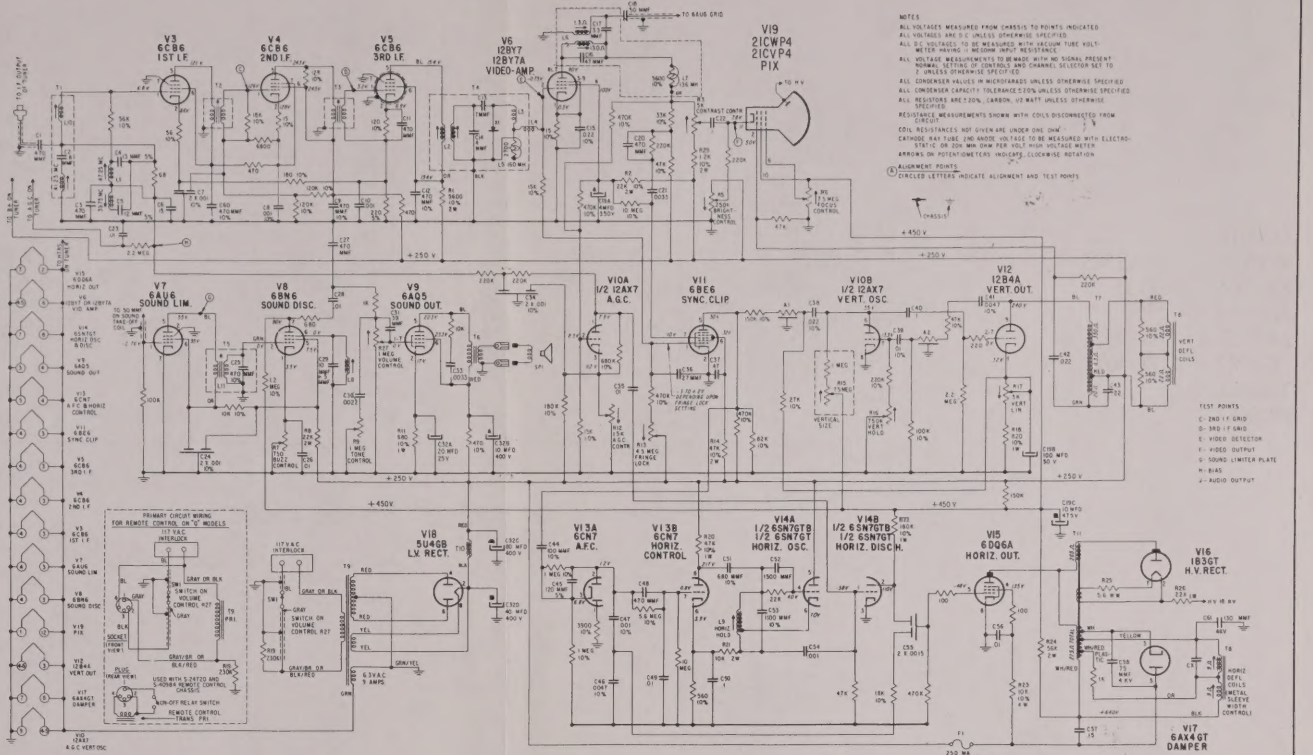
ZENITH MODELS	CHASSIS
Z2675EZ	17Z33
Z2675RZ	"
Z4000EZ	17Z33Q
Z4000RZ	17Z33Q
Z4006EZ	"
Z4006RZ	"


V3 6BZ6 1ST I.F.
V4 6BZ6 2ND I.F.
V5 6CB6 3RD I.F.
V6A 1/2 6AW8A VIDEO AMP.
V17 24DP4A PIX
V6B 1/2 6AW8A SOUND LIM.
V7 6BN6 SOUND DISC.
V8 6AQ5 SOUND OUT.
V9 6BU8 SYNC. CLIP.
V10A 1/2 6CM7 VERT. OSC.
V10B 1/2 6CM7 VERT. OUT.
V11A 1/2 6CN7 A.F.C.
V11B 1/2 6CN7 HORIZ. CONTROL
V12A 1/2 6CG7 HORIZ. OSC.
V12B 1/2 6CG7 HORIZ. DISCH.
V13 6DQ6A HORIZ. OUT.
V14 1B3GT H.V. RECT.
V15 6AU4GT 6AU4GTA DAMPER
V16 5U4GB L.V. RECT.
BROKEN FOR Q MODELS ONLY
FRONT VIEW SOCKET & WIRING FOR 17Z33Q MODEL
PRIMARY DIAGRAM FOR 17Z33Q MODELS, PQ1 SOCKET ON S-40983 OR S-40203 REMOTE TONE WAND CONTROL CHASSIS
PQ1
SWITCH ON BI-STABLE RELAY
PLUG USED WITH S-24733 AND S-40984 REMOTE CONTROL CHASSIS
PRIMARY WINDING FOR 17Z33Q MODEL S-40330 PLUG AND SOCKET ASSEMBLY USED WITH TWO WAY CONTROL CHASSIS.
PIN END VIEW OF PLUG
SOCKET
NOTES:
ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED.
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
ALL D.C. VOLTAGES TO BE MEASURED WITH VACUUM TUBE VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE.
ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT, NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR SET TO 2 UNLESS OTHERWISE SPECIFIED.
ALL CONDENSER VALUES MICROFARADS UNLESS OTHERWISE SPECIFIED.
ALL CONDENSER CAPACITY TOLERANCE ± 20% UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS ARE 10% TOLERANCE, CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
RESISTANCE MEASUREMENTS SHOWN WITH COILS DISCONNECTED FROM CIRCUIT.
COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM.
CATHODE RAY TUBE 2ND ANODE VOLTAGE TO BE MEASURED WITH ELECTROSTATIC OR 20K MIN OHM PER VOLT HIGH VOLTAGE METER.
ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.
ALIGNMENT POINTS:
CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS
TEST POINTS:
C- I.F. DETECTOR OUTPUT.
D- VIDEO OUTPUT.
E- I.F. A.G.C.
F- GROUND DURING I.F. ALIGNMENT.
G- SOUND DISC. AUDIO OUTPUT.
H- SOUND LIMITER PLATE.
+265 V
+120 V
+500 V
A.G.C.
BROKEN FOR Q MODELS ONLY
CHASSIS

SCHEMATIC COURTESY OF ZENITH RADIO CORPORATION

ZENITH

ZENITH MODELS	CHASSIS
Z2229RZ	19Z32
Z2230EZ	"
Z2230RZ	"
Z2257EZ	"
Z2257MZ	"
Z2257RZ	"
Z3010EZ	19Z32Q
Z3010HZ	"
Z3010RZ	"
Z3010YZ	"


V3 6CB6 1ST I.F.
V4 6CB6 2ND I.F.
V5 6CB6 3RD I.F.
V6 12BY7 12BY7A VIDEO-AMP.
V19 21CWP4 21CVP4 PIX
V7 6AU6 SOUND LIM.
V8 6BN6 SOUND DISC.
V9 6AQ5 SOUND OUT.
V10A 1/2 12AX7 A.G.C.
V11 6BE6 SYNC. CLIP.
V10B 1/2 12AX7 VERT. OSC.
V12 12B4A VERT. OUT.
V18 5U4GB L.V. RECT.
V13A 6CN7 A.F.C.
V13B 6CN7 HORIZ. CONTROL
V14A 1/2 6SN7GTB 1/2 6SN7GT HORIZ. OSC.
V14B 1/2 6SN7GTB 1/2 6SN7GT HORIZ. DISCH.
V15 6DQ6A HORIZ. OUT.
V16 1B3GT H.V. RECT.
V17 6AX4GT DAMPER
NOTES
ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED
ALL D.C. VOLTAGES TO BE MEASURED WITH VACUUM TUBE VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE
ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR SET TO 2 UNLESS OTHERWISE SPECIFIED
ALL CONDENSER VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED
ALL CONDENSER CAPACITY TOLERANCE ±20% UNLESS OTHERWISE SPECIFIED
ALL RESISTORS ARE ±20%, CARBON, ½ WATT UNLESS OTHERWISE SPECIFIED
RESISTANCE MEASUREMENTS SHOWN WITH COILS DISCONNECTED FROM CIRCUIT
COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM
CATHODE RAY TUBE 2ND ANODE VOLTAGE TO BE MEASURED WITH ELECTROSTATIC OR 20K MIN OHM PER VOLT HIGH VOLTAGE METER
ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION
ALIGNMENT POINTS
CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS
TEST POINTS
C- 2ND I.F. GRID
D- 3RD I.F. GRID
E- VIDEO DETECTOR
F- VIDEO OUTPUT
G- SOUND LIMITER PLATE
H- BIAS
J- AUDIO OUTPUT
PRIMARY CIRCUIT WIRING FOR REMOTE CONTROL ON "D" MODELS
117 V.A.C. INTERLOCK
SWITCH ON VOLUME CONTROL R27
USED WITH 5-24720 AND 5-40984 REMOTE CONTROL CHASSIS
NON-OFF RELAY SWITCH
REMOTE CONTROL TRANS. T9
117 V.A.C. INTERLOCK
SWITCH ON VOLUME CONTROL R27
6.3 V.A.C. 5 AMPS.
250 MA SLO-BLO FUSE
+450 V
+250 V
+10 KV

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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